UPOV

PLANT VARIETY PROTECTION

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CONTENTS

GAZETTE

EXTENSION OF PROTECTION TO FURTHER GENERA AND SPECIES

United Kingdom

By virtue of:

- The Plant Breeders' Rights (Herbaceous Perennials) (Variation) Scheme 1985 (Statutory Instrument 1985 No. 1090),
- The Plant Breeders' Rights (Trees, Shrubs and Woody Climbers) (Variation) Scheme 1985 (SI 1985 No. 1091),
- The Plant Breeders' Rights (Compositae) Scheme 1985 (SI 1985 No. 1093),
- The Plant Breeders' Rights (Poinsettias) Scheme 1985 (SI 1985 No. 1094),
- The Plant Breeders' Rights (Cactaceae) Scheme 1985 (SI 1985 No. 1095),
- The Plant Breeders' Rights (Soft Fruits) (Variation) Scheme 1985 (SI 1985 No. 1096),
- The Plant Breeders' Rights (Nerine) Scheme 1985 (SI 1985 No. 1097),

protection was extended, with effect from August 16, 1985, to the following (the Latin and English common names appear in the above-mentioned Schemes, except for the words in square brackets, whereas the French and German common names have been added, without guarantee of concordance, by the Office of the Union):

Latine	English	Français	Deutsch
Choisya Kunth	[Mexican Orange]	Oranger du Mexique	Orangenblume
Crocosmia Planch.	[Crocosmia]	Crocosmia	Crocosmia
Curtonus N.E. Br.	[Curtonus]	Curtonus	Curtonus
Epiphyllopsis (Berger) Backeb. et Knuth	[Easter Cactus]	Cactus de Pâques	Osterkaktus
Euphorbia pulcherrima Willd. ex Klotzsch	Poinsettia	Poinsettia	Poinsettie, Weihnachtsstern
Fragaria L.	[Strawberry]	Fraisier	Erdbeere
Gerbera Cass.	[Gerbera]	Gerbera	Gerbera
Nerine Herb.	[Nerine]	Nerine	Nerine
Rhipsalidopsis Britt. et Rose	[Easter Cactus]	Cactus de Pâques	Osterkaktus
Ribes	Red Currant	Groseillier rouge	Rote Johannisbeere
Rubus L.	Rubus, Rubus Hybrids	Rubus, Hybrides de Rubus	Rubus, Rubus-Hybriden
Schlumbergera Lem. (Zygocactus K. Schum.)	[Christmas Cactus]	Cactus de Noël	Weihnachtskaktus

In the case of the cacti, protection also extends to cultivated plant varieties which are the products of hybridization between members of the taxa Epiphyllopsis, Rhipsalidopsis and Schlumbergera.

In the case of Rubus, protection was hitherto available for raspberries and raspberry X blackberry hybrids. The variation of the Soft Fruits Scheme extends protection to the whole of the genus Rubus.

In the case of strawberry, protection was hitherto available for fruiting varieties under a specific Scheme. The variation of the Herbaceous Perennials Scheme thus extends protection to the ornamental varieties of the genus Fragaria.

The duration of protection was set at 20 years for Christmas and Easter cactuses, gerbera, poinsettia and strawberry, and at 25 years for Crocosmia, Curtonus, Mexican orange, Nerine, red currant and Rubus.

It is recalled that plant variety protection legislation of the United Kingdom does not impose any restriction on access by foreigners to protection on the basis of nationality or place of residence or registered office.

The list of the crops which are covered by plant variety protection legislation is given below, starting on page 6, with details of the duration and scope of protection. Explanations in respect of the list and some notes on the peculiarities of the plant variety protection system of the United Kingdom are given below in English, French and German.

Explanatory notes to the list starting on page 6

Layout of the list.- The list is divided into the major groups of plants (agricultural crops, vegetables, fruit crops and ornamental plants). A special layout is used for top fruit since the taxa covered in the case of fruiting varieties and in the case of rootstocks are different. Special tables are devoted:

- to the taxa protected under the Plant Breeders' Rights (Herbaceous Perennials) Scheme 1969 as amended since the only varieties which may be protected within a taxon specified under that instrument are those which are herbaceous and hardy under the climate of the United Kingdom,

- to the taxa protected under The Plant Breeders' Rights (Trees, Schrubs and Woody Climbers) Scheme 1969 as amended since the only varieties which may be protected within a taxon specified under that instrument are varieties of trees, shrubs and woody climbers,

- to the taxa protected under The Plant Breeders' Rights (Conifers and Taxads) Scheme 1969 since the latter provides for particular periods and scopes of protection in respect of certain taxa.

Contents of the list.- The Latin names and the underlined English common names are taken for the Schemes (but the English common names may have been used at places in the singular). The other common names have been added, without guarantee of concordance, by the Office of the Union.

Column A contains the duration of protection in years.

Column B contains the duration in years of the period, starting on the date of the grant of the rights, during which a compulsory licence has no effect.

Column C relates to the additional rights granted in accordance with paragraph 1(1) of Schedule 3 to the Plant Varieties and Seeds Act, which consist in the exclusive right to produce or propagate, or to authorize others to produce or propagate, the variety in the United Kingdom for the purpose of selling the parts or products of the variety specified below, and to sell or offer or expose for sale, or to authorize others to sell or offer or expose for sale, so far as they are obtained from plants produced or propagated outside the United Kingdom, such parts or products:

- Figure 1: cones of hops
- Figure 2: fruit
- Figure 3: rhubarb petioles
- Figure 4: cut blooms
- Figure 5: cut blooms, foliage or stems
- Figure 6: cut foliage.

Definition of the protected entity.- The precise definition of what may be protected is in general the following:

- in the case of Schemes for individual taxa: "all plant varieties of [common name of the taxon] which conform with the characteristics of cultivated plant varieties of [designation of the rank of the taxon and Latin name thereof]",

- in the case of collective Schemes: "all plant varieties of [collective designation of the group of taxa] which conform with the characteristics of cultivated plant varieties of [designation of the ranks of the taxa concerned and reference to a table containing the list of the Latin names and the corresponding common names, if any]."

Notes explicatives sur la liste commençant à la page 6

Présentation de la liste.- La liste est divisée en fonction des grands groupes de plantes (plantes agricoles, plantes potagères, plantes fruitières et plantes ornementales). Une présentation particulière est utilisée pour les arbres fruitiers du fait que les taxons couverts dans le cas des variétés fruitières et dans le cas des porte-greffes sont différents. Des tableaux particuliers sont consacrés :

- aux taxons protégés en vertu de "The PLants Breeders' Rights (Herbaceous Perennials) Scheme 1969" tel que modifié du fait que seules les variétés herbacées vivaces sous le climat du Royaume-Uni sont protégeables à l'intérieur d'un taxon désigné dans cet instrument,

- aux taxons protégés en vertu de "The Plant Breeders' Rights (Trees, Shrubs and Woody Climbers) Scheme 1969" tel que modifié du fait que seules les variétés d'arbres, de buissons ou de plantes grimpantes ligneuses sont protégeables à l'intérieur d'un taxon désigné dans cet instrument,

- aux taxons protégés en vertu de "The Plant Breeders' Rights (Conifers and Taxads) Scheme 1969" du fait que celui-ci prévoit des durées et des étendues de protection particulières pour certains taxons.

Contenu de la liste.- Les noms latins et les noms communs anglais soulignés sont repris des "Schemes" (les noms communs anglais étant toutefois mis au singulier dans certains cas). Les autres noms communs on été ajoutés, sans garantie de concordance, par le Bureau de l'Union.

La colonne A indique la durée de la protection, en années.

La colonne B indique la durée en années de la période qui commence à la date de l'octroi des droits et pendant laquelle une licence obligatoire ne porte pas d'effet.

La colonne C se rapporte aux droits supplémentaires accordés conformément au paragraphe 1.1) de l'annexe 3 de la loi sur les variétés végétales et les semences, lesquels consistent dans le droit exclusif de produire ou de multiplier, ou d'autoriser des tiers à produire ou à multiplier, la variété au Royaume-Uni aux fins de la vente des parties ou des produits de la variété spécifiés ci-dessous, et dans le droit exclusif de vendre, d'offrir à la vente ou d'exposer en vue de la vente, ou d'autoriser des tiers à vendre, offrir à la vente ou exposer en vue de la vente, dans la mesure où ils sont obtenus à partir de plantes produites ou multipliées en dehors du Royaume-Uni, ces parties ou produits :

- Chiffre 1 : cones de houblon
- Chiffre 2 : fruits
- Chiffre 3 : pétioles de rhubarbe rhubarbe
- Chiffre 4 : fleurs coupées
- Chiffre 5 : fleurs, feuillage ou tiges coupés
- Chiffre 6 : feuillage coupé.

Définition de l'entité protégée.- La définition exacte de ce qui peut être protégé est en général la suivante :

- dans le cas de "Schemes" relatifs à des taxons individuels : "toutes les variétés végétales de [nom commun du taxon] qui sont conformes aux caractères des variétés cultivées de [définition du rang du taxon et nom latin de celui-ci]",

- dans le cas de "Schemes" collectifs : "toutes les variétés végétales de [désignation collective du groupe de taxons] qui sont conformes aux caractères des variétés cultivées de [désignation des rangs des taxons concernés et référence à un tableau contenant la liste des noms latins de ces taxons et, le cas échéant, des noms communs correspondants]".

Erläuternde Anmerkungen zu der auf Seiten 6 ff. wiedergegebenen Liste

Aufbau der Liste.- Die Liste ist nach den Hauptpflanzengruppen eingeteilt (landwirtschaftliche Pflanzen, Gemüsepflanzen, Obstpflanzen und Zierpflanzen). Ein besonderer Aufbau wird für Obstbäume benutzt, da die schutzfähigen taxonomischen Einheiten im Falle von fruchttragenden Sorten anders sind als im Falle von Unterlagen. Besondere Tabellen sind den folgenden Einheiten gewidmet:

- den taxonomischen Einheiten, die in der geänderten Fassung von "The Plant Breeders' Rights (Herbaceous Perennials) Scheme 1969" aufgeführt sind, da nur die in dem Klima des Vereinigten Königreichs winterharten krautartigen Sorten der darin bezeichneten taxonomischen Einheiten schutzfähig sind,

- den taxonomischen Einheiten, die in der geänderten Fassung von "The Plant Breeders' Rights (Trees, Shrubs and Woody Climbers) Scheme 1969" aufgeführt sind, da nur Sorten von Bäumen und Sträuchern sowie holzartigen Kletterpflanzen der darin bezeichneten taxonomischen Einheiten schutzfähig sind,

- den taxonomischen Einheiten, die in "The Plant Breeders' Rights (Conifers and Taxads) Scheme 1969" aufgeführt sind, da für bestimmte taxonomische Einheiten eine besondere Dauer und ein besonderer Schutzumfang vorgesehen werden.

Inhalt der Liste.- Die lateinischen und die unterstrichenen englischen landesüblichen Namen sind den "Schemes" entnommen worden (die letzteren sind aber erforderlichenfalls in die Einzahl gebracht worden). Die anderen landesüblichen Namen wurden durch das Verbandsbüro hinzugefügt, jedoch ohne Gewähr für deren Uebereinstimmung mit den Originalangaben in den "Schemes".

Spalte A gibt die Schutzdauer in Jahren an.

Spalte B gibt in Jahren die Dauer des mit dem Tage der Schutzrechtserteilung beginnenden Zeitabschnitts an, in dem eine erteilte Zwangslizenz noch keine Wirkung entfaltet.

Spalte C befasst sich mit den nach Absatz 1.1) der Anlage 3 des Gesetzes über Pflanzensorten und Saatgut gewährten zusätzlichen Rechten, die zum Gegenstand haben, dass der Inhaber das ausschliessliche Recht geniesst, die Sorte in dem Vereinigten Königreich zum Zweck des Vertriebs von den nachfolgend aufgeführten Teilen oder Produkten der Sorte zu erzeugen oder zu vermehren oder andere hierzu zu ermächtigen sowie solche Teile oder Produkte zu verkaufen, feilzuhalten oder zum Verkauf auszustellen oder andere hierzu zu ermächtigen, sofern diese Teile oder Produkte aus Pflanzen erzeugt worden sind, die ausserhalb des Vereinigten Königreich erzeugt oder vermehrt worden sind.

- Zahl 1: Hopfenzapfen
- Zahl 2: Obst
- Zahl 3: Rhabarberstiele
- Zahl 4: Schnittblumen
- Zahl 5: Schnittblumen, -laub oder -triebe
- Zahl 6: Schnittblumen.

Definition der schutzfähigen Einheit.- Welche Einheiten den Gegenstand des Schutzes bilden, wird für den Normalfall wie folgt definiert:

- im Falle von "Schemes" für einzelne taxonomische Einheiten: "Alle Pflanzensorten von [landesüblicher Name der taxonomischen Einheit], die den Merkmalen von Kultursorten von [Name des Rangs der taxonomischen Einheit und lateinischer Name der Einheit] entsprechen,"

- im Falle von "Schemes" für Gruppen von taxonomischen Einheiten: "Alle Pflanzensorten von [Sammelbezeichnung einer Gruppe von taxonomischen Einheiten], die den Merkmalen von Kultursorten von [Bezeichnung der Ränge der betreffenden taxonomischen Einheiten und Hinweis auf eine Tabelle, die die Liste der lateinischen Namen dieser taxonomischen Einheiten und gegebenenfalls die entsprechenden landesüblichen Namen enthält] entsprechen."

Plant Variety Protection in the United Kingdom* / Protection des obtentions végétales au Royaume-Uni* / Sortenschutz im Vereinigten Königreich*

1. AGRICULTURAL CROPS / PLANTES AGRICOLES / LANDWIRTSCHAFTLICHE PFLANZEN

Latine	English	Français	Deutsch	A	B	C
Agrostis canina L. ssp. canina Hwd	Velvet Bent	Agrostis des chiens	Hundsstraussgras	25	-	-
Agrostis gigantea Roth	Red Top (Black Bent)	Agrostide blanche, Agrostide géante	Weisses Straussgras	25	-	-
Agrostis stolonifera L.	Creeping Bent	Agrostide blanche, Agrostide stolonifère	Flechtstraussgras	25	-	-
Agrostis tenuis Sibth.	Brown Top, Common Bent	Agrostide commune	Rotes Straussgras	25	-	-
Avena	Oats	Avoine	Hafer	20	-	-
Brassica juncea (L.) Czern. et Coss. in Czern.	Brown Mustard	Moutarde brune	Sareptasenf	20	-	-
Brassica napus L. var. napobrassica Peterm.	Swede	Chou-navet, Rutabaga	Kohlrübe	20	-	-
Brassica napus L. ssp. oleifera (Metzg.) Sinsk	Swede Rape, including Oilseed Rape	Colza	Raps	20	-	-
Brassica nigra (L.) W. Koch	Black Mustard	Moutarde noire	Schwarzer Senf	20	-	-
Brassica oleracea L. convar. acephala (DC.)	Fodder Kale	Chou fourrager	Futterkohl	25	3	-
Dactylis glomerata L.	Cocksfoot, Orchard Grass	Dactyle	Knaulgras	25	-	-
Festuca arundinacea Schreb.	Tall Fescue	Fétuque élevée	Rohrschwingel	25	-	-
Festuca pratensis Huds.	Meadow Fescue	Fétuque des prés	Wiesenschwingel	25	-	-
Festuca rubra L.	Red Fescue (including Chewings Fescue)	Fétuque rouge	Rotschwingel	25	-	-
Hordeum vulgare L. sensu lato	Barley	Orge	Gerste	20	-	-
Humulus lupulus L.	Hops	Houblon	Hopfen	20	-	1
Linum usitatissimum L.	Linseed and Flax	Lin	Lein	20	-	-
Lolium X hybridum Hausskn.	Hybrid Ryegrass	Ray-grass hybride	Bastardweidelgras, Oldenburgisches Weidelgras	25	-	-
Lolium multiflorum Lam.	Italian Ryegrass, Westerwold Ryegrass	Ray-grass d'Italie	Welsches Weidelgras, Italienisches Raygras	25	-	-
Lolium perenne L.	Perennial Ryegrass	Ray-grass anglais	Deutsches Weidelgras	25	-	-

* See explanations, page 3 / Voir les explications à la page 4 / Siehe Erläuterungen auf Seite 5

Latine	English	Français	Deutsch	A	B	C
Lupinus albus L.	White Lupin (excluding ornamental varieties)	Lupin blanc (sauf variétés ornementales)	Weisslupine (ausser Ziersorten)	20	-	-
Lupinus angustifolius L.	Blue Lupin (excluding ornamental varieties)	Lupin bleu (sauf variétés ornementales)	Blaue Lupine (ausser Ziersorten)	20	-	-
Lupinus luteus L.	Yellow Lupin (excluding ornamental varieties)	Lupin jaune (sauf variétés ornementales)	Gelbe Lupine (ausser Ziersorten)	20	-	-
Medicago sativa L.	Lucerne, Alfalfa	Luzerne (cultivée)	Blaue Luzerne	25	-	-
Medicago X varia Martyn	(Hybrid) Lucerne	Luzerne hybride	Bastardluzerne	25	-	-
Oenothera L.	Oenothera (excluding ornamental varieties)	Onagre (sauf variétés ornementales)	Nachtkerze (ausser Ziersorten)	20	-	-
Phleum pratense L. (including Phleum bertolonii DC. = P. nodosum L.)	Timothy	Fléole	Lieschgras	25	-	-
Poa nemoralis L.	Wood Meadow-grass	Pâturin des bois	Hainrispengras	25	-	-
Poa palustris L.	Swamp Meadow-grass	Pâturin des marais	Sumpfrispengras	25	-	-
Poa pratensis L.	Smooth Stalked Meadow-grass, Kentucky Blue-grass,	Pâturin des prés	Wiesenrispengras	25	-	-
Poa trivialis L.	Rough Stalked Meadow-grass	Pâturin commun	Gemeines Rispengras	25	-	-
Secale cereale L.	Rye	Seigle	Roggen	20	-	-
Sinapis alba L.	White Mustard	Moutarde blanche	Weisser Senf	20	-	-
Solanum tuberosum L. sensu lato	Potato	Pomme de terre	Kartoffel	25	2	-
Trifolium pratense L.	Red Clover	Trèfle violet	Rotklee	25	-	-
Trifolium repens L.	White Clover	Trèfle blanc	Weissklee	25	-	-
Trigonella foenum-graecum L.	Fenugreek	Fenugrec	Bockshorn Klee, Griechisch-Heu	20	-	-
X triticosecale Wittmack	Triticale	Triticale	Triticale	20	-	-
Triticum	Wheat	Blé	Weizen	20	-	-
Zea mays L.	Maize (excluding Sweet-corn and popcorn)	Maïs (sauf maïs sucré et popcorn)	Mais (ausser Zuckermais und Popkorn)	20	-	-

2. VEGETABLES (including Field Beans and Field Peas) / PLANTES POTAGERES (y compris la féverole et le pois fourrager) / GEMUESEPFLANZEN (einschliesslich Ackerbohne und Futtererbse)

Latine	English	Français	Deutsch	A	B	C
Apium graveolens L.	Celery, Celeriac	Céleri, Céleri-rave	Sellerie	20	-	-
Beta vulgaris L. var. esculenta L.	Beetroot, Garden Beet	Betterave rouge, Betterave potagère	Rote Rübe	20	-	-

Latine	English	Français	Deutsch	A	B	C
Brassica oleracea L. convar. botrytis (L.) Alef. var. botrytis	Cauliflower	Chou-fleur	Blumenkohl	20	-	-
Brassica oleracea L. var. bullata subvar. gemmifera DC.	Brussels Sprouts	Chou de Bruxelles	Rosenkohl	20	-	-
Brassica oleracea L. var. bullata DC. et var. sabauda	Savoy Cabbage	Chou de Milan	Wirsing	20	-	-
Brassica oleracea L. var. capitata L. f. alba DC.	White Cabbage	Chou cabus	Weisskohl	20	-	-
Brassica oleracea L. var. capitata L. f. rubra (L.) Thell.	Red Cabbage	Chou rouge	Rotkohl	20	-	-
Brassica rapa L. var. rapa (L.) Thell.	Turnip	Navet	Herbstrübe, Mairübe	20	-	-
Cucurbita pepo L.	Marrows, Pumpkin Courgette, Vegetable Marrow	Courge, Pâtisson, Citrouille	Gartenkürbis,	20	-	-
Lactuca sativa L.	Lettuce	Laitue	Salat	20	-	-
Phaseolus coccineus L.	Runner Bean, Kidney Bean	Haricot d'Espagne	Prunkbohne	20	3	-
Phaseolus vulgaris L.	French Bean	Haricot	Gartenbohne	20	3	-
Pisum sativum L. sensu lato	Pea, Field Pea	Pois, Petit pois, Pois fourrager	Gemüseerbse, Trockenspeiseerbse, Futtererbse	20	3	-
Vicia faba L. sensu lato	Broad Bean, Field Bean	Fève, Féverole	Dicke Bohne, Ackerbohne (Puffbohne)	20	-	-

3. FRUIT CROPS / PLANTES FRUITIERES / OBSTPFLANZEN

Top Fruit / Arbres fruitiers / Obstbäume

Common names (fruit crops)	Protected taxa: Fruiting varieties	Protected taxa: Rootstocks	A	B	C
Apple	Species Malus domestica Borkh.	Malus spp.	30	3	2
Cherry	Species Prunus avium L., Prunus cerasus L. and Prunus fruticosa Pall.	Prunus species or varieties of species belonging to the subgenus Cerasus Pers. (genus Cerasus Mill.) and hybrids between any of these, or between species or varieties or hybrids belonging to the subgenus Cerasus Pers. and species or varieties or hybrids belonging to other subgenera, subdivisions or segregates of the genus Prunus L.	30	3	2
Plum Damson, Bullace and Mirabelle	Species Prunus domestica or Prunus cerasifera Species Prunus insititia	Species Prunus domestica, Prunus cerasifera or Prunus insititia, including hybrids derived from any two or all of these species.	30	3	2
Pear	Species Pyrus communis	Pyrus spp.	30	3	2

Noms communs (plantes fruitières)	Taxons protégés		A	B	C
	plantes fruitières	porte-greffes			
Pommier	Espèce Malus domestica Borkh.	Malus spp.	30	3	2
Cerisier	Espèces Prunus avium L., Prunus cerasus L. et Prunus fruticosa Pall.	Espèces de Prunus ou variétés d'espèces appartenant au sous-genre Cerasus Pers. (genre Cerasus Mill.) et hybrides entre ceux-ci, ou entre espèces ou variétés ou hybrides appartenant au sous-genre Cerasus Pers. et espèces ou variétés ou hybrides appartenant à d'autres sous-genres, subdivisions ou ségrégats du genre Prunus L.	30	3	2
Prunier Prunier de Damas, - [Bullace] et Mirabellier	Espèces Prunus domestica et Prunus cerasifera Espèce Prunus insititia	Espèces Prunus domestica, Prunus cerasifera et Prunus insititia, y compris les hybrides dérivant de deux de ces espèces ou de toutes	30	3	2
Poirier	Espèce Pyrus communis	Pyrus spp.	30	3	2

Landesübliche Namen (Obst)	Schutzfähige taxonomische Einheiten		A	B	C
	Fruchttragende Sorten	Unterlagen			
Apfel	Art Malus domestica Borkh.	Malus spp.	30	3	2
Kirsche	Arten Prunus avium L., Prunus cerasus L. und Prunus fruticosa Pall.	Prunusarten oder Sorten von Arten, die der Untergattung Cerasus Pers. (Gattung Cerasus Mill.) angehören, und Hybriden zwischen diesen Arten oder zwischen Arten oder Sorten oder Hybriden, die der Untergattung Cerasus Pers. angehören, sowie Arten oder Sorten oder Hybriden, die anderen Untergattungen, Unterabteilungen oder Aufspaltungen der Gattung Prunus L. angehören.	30	3	2
Pflaume Damaszenerpflaume Haferpflaume oder Mirabelle	Art Prunus domestica und Prunus cerasifera Art Prunus insititia	Art Prunus domestica, Prunus cerasifera oder Prunus insititia, unter Einschluss von Hybriden, die von zwei oder von allen dieser Arten abgeleitet werden.	30	3	2
Birne	Art Pyrus communis	Pyrus spp.	30	3	2

Other Fruit Crops / Autres plantes fruitières /Andere Obstarten

Latine	English	Français	Deutsch	A	B	C
Fragaria	Strawberry	Fraisier	Erdbeere	20	-	2
Rheum	Rhubarb	Rhubarbe	Rhabarber	25	3	3
Ribes	Red Currant	Groseillier rouge	Rote Johannisbeere	25	2	2
Ribes grossularia, Ribes uva-crispa	Gooseberry	Groseillier à maquereau	Stachelbeere	20	-	2
Ribes nigrum, Ribes ussuriense, Ribes dikuscha	Black Currant	Cassis	Schwarze Johannisbeere	25	2	2
Rubus	Rubus, Rubus Hybrids	Rubus, Hybrides de Rubus	Rubus, Rubus-Hybriden	25	2	2

4. ORNAMENTAL PLANTS COVERED BY INDIVIDUAL SCHEMES / PLANTES ORNEMENTALES COUVERTES PAR DES "SCHEMES" PARTICULIERS / UNTER BESONDEREN "SCHEMES" FALLENDE ZIERPFLANZEN

Latine	English	Français	Deutsch	A	B	C
Begonia X hiemalis Fotsch	Elatior Begonia	Bégonia elatior	Elatior-Begonie	20	-	-
Chrysanthemum morifolium Ramatuelle C. indicum auct. non L. C. sinense Sabine C. chinense hort. C. hortorum W. Miller C. japonense (Makino) Nakai C. vestitum (Hemsley) Stapf C. makinoi Matsumura and Nakai C. sibiricum (DC.) Fischer ex Turcz. C. zawadskii Herbich and varieties C. rubellum Sealy (C. erubescens hort. non Stapf) C. cuneifolium Kitamura C. okiense Kitamura C. boreale (Makino) Makino C. aphrodite (Kitamura) C. arcticum auct. non L. C. yezoense Maekawa Korean chrysanthemums Konji chrysanthemums Cascade chrysanthemums C. ornatum Hemsley C. koreanum (coreanum) hort.	Chrysanthemum	Chrysanthème	Chrysantheme	20	-	4
Cymbidium Sw.	Cymbidium	Cymbidium	Cymbidie	20	-	4
Dahlia	Dahlia	Dahlia	Dahlie	20	-	4
Delphinium	Perennial Delphinium	Pied d'alouette vivace	Ausdauernder Rittersporn	20	2	4
Dianthus L. (excluding Dianthus barbatus L.)	Carnation, Pink, (excl. Sweet William)	Oeillet (sauf Oeillet de poète)	Nelke (ausser Bartnelke)	20	-	4
Epiphyllopsis (Berger) Backeb. et Knuth*	Easter Cactus	Cactus de Pâques	Osterkaktus	20	-	-
Euphorbia pulcherrima Willd. ex Klotzsch	Poinsettia	Poinsettia	Poinsettie, Weihnachtsstern	20	-	4
Freesia Klatt	Freesia	Freesia	Freesie	25	3	4
Gerbera Cass.	Gerbera	Gerbera	Gerbera	20	-	4
Gladiolus L.	Gladiolus	Glaïeul	Gladiole	25	3	4
Lilium	Lily	Lis	Lilie	20	-	4
Narcissus L.	Narcissus, Daffodil, Jonquil	Narcisse, Jonquille	Narzisse	25	3	4
Nerine Herb.	Nerine	Nerine	Nerine	25	3	4

* Including hybrids between / Y compris les hybrides entre / Einschliesslich der Hybriden zwischen : Epiphyllopsis, Rhipsalidopsis & Schlumbergera.

Latine	English	Français	Deutsch	A	B	C
Pelargonium	Pelargonium, Geranium, Stork's Bill	Géranium, Pelargonium	Pelargonie	20	-	-
Rhipsalidopsis Britt. et Rose*	Easter Cactus	Cactus de Pâques	Osterkaktus	20	-	-
Rhododendron L.	Rhododendron, Azalea, Azaleodendron	Rhododendron, Azalée	Rhododendron, Azalee	25	3	-
Rosa	Rose	Rosier	Rose	20	-	4
Saintpaulia ionantha H. Wendl.	Saintpaulia, African Violet	Saintpaulia	Usambaraveilchen	20	-	-
Schlumbergera Lem. (Zygocactus K. Schum.)*	Christmas Cactus	Cactus de Noël	Weihnachtskaktus	20	-	-
Streptocarpus	Streptocarpus, Cape Primrose	Streptocarpus	Drehfrucht	20	-	-

5. PLANTS COVERED BY THE PLANT BREEDERS' RIGHTS (HERBACEOUS PERENNIALS) SCHEME 1969, AS AMENDED / PLANTES COUVERTES PAR "THE PLANT BREEDERS' RIGHTS (HERBACEOUS PERENNIALS) SCHEME 1969", TEL QUE MODIFIE / UNTER DIE GEAENDERTE FASSUNG VON "THE PLANT BREEDERS' RIGHTS (HERBACEOUS PERENNIALS) SCHEME 1969" FALLENDE PFLANZEN

Latine	English	Français	Deutsch	A	B	C
Achillea L.	Milfoil, Yarrow	Achillée	Schafgarbe	20	-	-
Aconitum L.	Monkshood	Aconit	Eisenhut	20	3	-
Alstroemeria L.	Alstroemeria, Herb Lily	Alstroemère, Lis des Incas	Inkalilie	20	2	4
Anchusa angustissima K. Koch	-	Langue-de-boeuf	Ochsenzunge	20	1	-
Anchusa italica Retz.	Italian Bugloss	Buglosse d'Italie, Langue-de-boeuf	Italienische Ochsenzunge	20	-	-
Anemone hupehensis Lemoine	Japanese Anemone	Anémone du Japon	Herbstanemone	20	-	-
Anthemis L.	Chamomile	Anthémis	Hundskamille	20	-	-
Armeria (DC.) Willd.	Thrift, Sea Pink	Arméria	Grasnelke	20	2	-
Artemisia L.	Mugwort	Armoise	Beifuss	20	-	-
Aster L.	Aster, Michaelmas Daisy	Aster	Aster	20	-	4
Astilbe Buch.-Ham.	Astilbe	Astilbe, Hoteia	Astilbe, Prachtspiere	20	2	4
Bergenia Moench	Megasea	Bergenia	Wickelwurz	20	2	-
Caltha L.	Marsh Marigold, King Cup	Populage	Dotterblume	20	-	-
Campanula L.	Campanula, Bell Flower	Campanule	Glockenblume	20	1	4
Catananche L.	Cupid's Dart	Catananche	Rasselblume	20	1	-
Centaurea L.	Cornflower, Blue Bottle	Centaurée	Flockenblume	20	-	-

* Including hybrids between / Y compris les hybrides entre / Einschliesslich der Hybriden zwischen : Epiphyllopsis, Rhipsalidopsis & Schlumbergera.

Latine	English	Français	Deutsch	A	B	C
Ceratostigma plumbaginoides Bunge	Hardy Plumbago	Dentelaire	Bleiwurz	20	-	-
Chrysanthemum coccineum Willd. (Pyrethrum)	Pyrethrum	Pyrèthre	Kaukasische Insektenblume	20	-	4
Chrysanthemum maximum Ramond	Shasta Daisy	Grande marguerite	-	20	-	4
Cimicifuga Wernischek	Bugwort, Bugbane	Cimicaire, Cimifuge	Silberkerze, Wanzenkraut	20	1	-
Clematis heracleifolia DC.	-	-	-	20	1	-
Convallaria L.	Lily of the Valley	Muguet	Maiblume, Maiglöckchen	20	1	4
Coreopsis L.	Tickseed	Coréopsis	Mädchenauge	20	-	-
Cortaderia Stapf	Pampas Grass	Gynérium, Herbe de la pampa, Gynérion	Pampasgras	20	3	4
Crocosmia Planch.	Crocosmia	Crocosmia	Crocosmia	25	3	4
Curtonus N.E. Br.	Curtonus	Curtonus	Curtonus	25	3	4
Dicentra Borkh. corr. Bernh.	Bleeding Heart, Dutchman's Breeches	Dicentra, Dielytra, Coeur de Marie	Tränendes Herz, Flammendes Herz	20	1	-
Doronicum L.	Leopard's Bane	Doronic	Gemswurz	20	-	-
Echinops L.	Globe Thistle	Echinops	Kugeldistel	20	1	-
Erigeron L.	Flea-bane	Erigéron, Vergerette	Berufskraut, Feinstrahl	20	-	-
Eryngium L.	Eryngo	Panicaut	Edeldistel, Mannstreu	20	1	-
Euphorbia L.	Spurges	Euphorbe	Wolfsmilch	20	1	-
Fragaria L.	Strawberry	Fraisier	Erdbeere	25	-	-
Gaillardia Fougeroux	Blanket-flower	Gaillarde	Kokardenblume	20	1	-
Galega L.	Goats' Rue	Galéga	Geissraute	20	1	-
Geranium L.	Crane's Bill	Géranium	Storchschnabel	20	-	-
Geum L.	Avens	Benoîte	Nelkenwurz	20	1	-
Gypsophila L.	Gyp, Gypsophila, Baby's Breath	Gypsophile	Gipskraut, Schleierkraut	20	2	4
Helenium L.	Sneezeweed	Hélénium	Sonnenkraut	20	-	-
Helianthus L.	Sunflower	Hélianthus	Sonnenblume	20	-	-
Heliopsis Pers.	Heliopsis, North American Ox-eye	Héliopsis	Sonnenauge	20	1	-
Helleborus L.	Hellebore, Christmas Rose, Lenten Rose	Hellébore, Rose de Noël	Nieswurz, Schneerose, Christusrose	20	3	4
Hemerocallis L.	Day-lily	Hémérocalle	Taglilie	20	1	-
Heuchera L.	Alum Root, Coral Flower	Heuchera	Purpurglöckchen	20	-	-
Holcus L.	Yorkshire Fog	Houque, Houlque	Honiggras	20	-	-

Latine	English	Français	Deutsch	A	B	C
Hosta Tratt.	Plantain Lily, Funkia, Hosta	Hémérocalle du Japon, Funkia	Funkie	20	2	-
Iris L. (excluding bulbous varieties)	Iris (excluding bulbous varieties)	Iris (sauf variétés à bulbes)	Iris (ausser zwiebelbildende Sorten)	20	2	-
Kniphofia Moench	Red Hot Poker, Torch-lily	Tritoma, Faux-aloès	Fackellilie, Tritome	20	3	-
Liatris Gaertn. ex Schreb.	Liatris, Blazing Star, Gayfeather	Liatris	Prachtscharte	20	1	4
Ligularia Cass.	Golden Ray	Ligulaire	Goldkolben	20	1	-
Limonium Mill. (Statice)	Sea Lavender, Statice	Limonium, Statice	Widerstoss, Meerlavendel	20	1	4
Lobelia L.	Lobelia, Cardinal Flower	Lobélie	Lobelie	20	1	-
Lupinus L.	Lupin	Lupin	Lupine	20	1	-
Lychnis L.	Campion	Lychnis	Lichtnelke	20	-	-
Lythrum L.	Loosestrife	Lythrum	Weiderich	20	1	-
Malva L.	Mallow	Mauve	Malve	20	1	-
Monarda L.	Bergamot, Bee Balm, Horsemint	Monarde	Monarde, Bienenbalsam, Pferdeminze	20	-	-
Nepeta L.	Cat Mint	Népéta, Herbe-aux-chats	Katzenminze	20	-	-
Oenothera L.	Oenothera, Evening Primrose	Onagre	Nachtkerze	20	1	-
Origanum L.	Sweet Marjoram	Origan	Dost	20	-	-
Paeonia L.	Paeony	Pivoine	Päonie, Pfingstrose	25	5	4
Papaver L.	Poppy, Oriental Poppy	Pavot	Mohn	20	-	-
Penstemon Schmidel	Beard Tongue	Penstemon, Galane barbue	Bartfaden	20	1	-
Phlox L.	Phlox	Phlox	Phlox, Flammenblume	20	1	-
Phygelius E. Mey.	Cape Figwort	Phygelius	Phygelius	20	-	-
Physostegia Benth.	Obedient Plant, Lion's Heart	Physostégie	Gelenkblume	20	1	-
Polemonium L.	Jacob's Ladder	Polemoine	Jakobsleiter, Sperrkraut	20	-	-
Polygonatum Mill.	Solomon's Seal	Sceau de Salomon	Salomons Siegel	20	1	-
Polygonum L.	Knotweed, Knotgrass	Renouée	Knöterich	20	1	-
Potentilla L.	Cinquefoil	Potentille	Fingerkraut	20	1	-
Primula L.	Auricula, Oxlip, Cowslip, Primrose	Primevère	Primel, Schlüsselblume	20	1	4
Pulmonaria L.	Lungwort	Pulmonaire	Lungenkraut	20	-	-

Latine	English	Français	Deutsch	A	B	C
Pulsatilla Mill. (Anemone pulsatilla L. and allies)	Pasque Flower	Anémone pulsatille	Gemeine Küchenschelle	20	1	-
Rudbeckia L.	Cone Flower	Rudbeckia	Sonnenhut	20	1	-
Salvia L.	Sage	Sauge	Salbei	20	1	-
Saponaria L.	Saponaria	Saponaire	Seifenkraut	20	-	-
Scabiosa L.	Scabious	Scabieuse	Grindkraut, Skabiose	20	1	4
Schizostylis Backh. et Harv.	Crimson Flag	Schizostylis	Spaltgriffel	20	1	4
Sedum L.	Stonecrop, Ice Plant	Sédum	Fetthenne	20	-	-
Sidalcea A. Gray	Prairie Mallow	Sidalcea	Präriemalve	20	-	-
Silene L.	Catchfly	Silène	Leimkraut	20	-	-
Sisyrinchium L.	Satin Flower, Blue Eyed Grass	Sisyrinchium, Bermudienne	Grasschwertel, Binsenlilie	20	-	-
Solidago L.	Golden Rod	Verge d'or	Goldrute	20	-	-
Stachys L.	Woundwort	Epiaire	Ziest	20	-	-
Stokesia L'Hér.	Stocke's Aster	Stokesia	Stokesia	20	1	-
Teucrium chamaedrys L.	Wall Germander	Germandrée petit-chêne	Edelgamander	20	-	-
Thalictrum L.	Meadow Rue	Pigamon	Wiesenraute	20	3	-
Tiarella L.	Foam Flower	Tiarella	Schaumblüte	20	-	-
Tradescantia L.	Spider Wort	Tradescantia, Misère	Dreimasterblume	20	-	-
Trollius L.	Globe Flower	Trolle	Trollblume	20	1	-
Veratrum L.	False Hellebore	Vératre	Germer, Nieswurz	20	3	-
Verbascum L.	Mullein	Molène	Königskerze	20	1	-
Veronica L.	Speedwell	Véronique	Ehrenpreis	20	1	-
Viola L.	Violet, Pansy	Violette, Pensée	Veilchen, Stiefmütterchen	20	-	4

6. PLANTS COVERED BY THE PLANT BREEDERS' RIGHTS (TREES, SHRUBS AND WOODY CLIMBERS) SCHEME 1969, AS AMENDED / PLANTES COUVERTES PAR "THE PLANT BREEDERS' RIGHTS (TREES, SHRUBS AND WOODY CLIMBERS) SCHEME 1969", TEL QUE MODIFIE / UNTER DIE GEAENDERTE FASSUNG VON "THE PLANT BREEDERS' RIGHTS (TREES, SHRUBS AND WOODY CLIMBERS) SCHEME 1969" FALLENDE PFLANZEN

Latine	English	Français	Deutsch	A	B	C
Abelia R. Br.	Abelia	Abelia	Abelia	20	2	-
Abutilon megapotamicum St.-Hil. et Naud.	Abutilon	Abutilon	Abutilon	20	2	-
Abutilon X milleri hort.	Abutilon	Abutilon	Abutilon	20	2	-
Abutilon ochsenii (Phil.) Philippi	Abutilon	Abutilon	Abutilon	20	2	-
Abutilon vitifolium Presl	Abutilon	Abutilon	Abutilon	20	2	-
Acer L.	Maple	Erable, Sycomore	Ahorn	30	3	-

Latine	English	Français	Deutsch	A	B	C
Actinidia Lindl.	Actinidia	Actinidia	Strahlengriffel	20	2	-
Aesculus L. excluding Aesculus parviflora Walt.	Horse Chestnut	Marronnier	Rosskastanie	30	3	-
Aesculus L. parviflora Walt.	Chestnut	Marronnier	Rosskastanie	20	2	-
Alnus Mill.	Alder	Aulne	Erle	30	3	-
Amelanchier Medik.	Serviceberry, Snowy Mespilus	Amélanchier	Felsenbirne	20	2	-
Ampelopsis hort.	Ampelopsis	Vigne-vierge	Doldenrebe	20	2	-
Andromeda L.	Bog Rosemary	Andromède	Gränke, Rosmarinheide	25	2	-
Aralia chinensis L.	Chinese Angelica Tree	Angélique en arbre de Chine	Angelikabaum	30	5	-
Aralia elata (Miq.) Seem.	Japanese Angelica Tree	Angélique en arbre du Japon	-	30	5	-
Aralia spinosa L.	Hercules Club, Devil's Walking Stick	Angélique épineuse, Bâton du diable	-	30	5	-
Arbutus L.	Strawberry Tree	Arbousier	Erdbeerbaum	30	5	-
Arctostaphylos Adans.	Bearberry	Raisin d'ours	Bärentraube	30	5	-
Aronia Medik.	Chokeberry	Aronia	Apfelbeere	20	2	-
Aucuba Thunb.	Aucuba	Aucuba	Aukube	25	3	5
Berberis L.	Berberis, Barberry	Berberis, Epine-vinette	Berberitze	20	2	-
Betula L.	Birch	Bouleau	Birke	30	5	-
Buddleja L. excluding B. asiatica Lour., B. auriculata Benth., B. madagascariensis Lam. and B. officinalis Maxim.	Buddleia, Butterfly-bush	Buddleia	Buddleie, Schmetterlingsstrauch	20	2	-
Buxus L.	Box	Buis	Buchsbaum	25	3	5
Callicarpa L. excluding C. purpurea Juss. and C. rubella Lindl.	Callicarpa, French Mulberry, Beauty-berry	Callicarpa	Schönfrucht	20	2	-
Calluna Salisb.	Heather, Ling	Callune	Besenheide	25	3	5
Camellia japonica L.	Camellia	Camélia du Japon	Kamelie	30	5	5
Camellia reticulata Lindl.	Camellia	Camélia	Kamelie	30	5	5
Camellia saluenensis Stapf ex Bean	Camellia	Camélia	Kamelie	30	5	5
Camellia saluenensis Stapf ex Bean X C. reticulata Lindl.	Camellia	Camélia	Kamelie	30	5	5
Camellia sasanqua Thunb.	Camellia	Camélia	Kamelie	30	5	5
Camellia X williamsii W.W. Sm.	Camellia	Camélia	Kamelie	30	5	5
Campsis Lour. (Tecoma)	Trumpet Flower	Bignonia, Jasmin de Virginie	Trompetenblume, Trompetenwinde	30	5	-
Caragana Fabr.	Pea Shrub, Pea Tree	Caragana	Erbsenstrauch	30	5	-

Latine	English	Français	Deutsch	A	B	C
Carpinus L.	Hornbeam	Charme	Hainbuche	30	5	-
Caryopteris Bunge	Caryopteris	Caryopteris	Bartblume	20	2	-
Cassiope D. Don	Cassiope	Cassiope	Schuppenheide	25	3	-
Castanea Mill.	Chestnut	Châtaignier	Kastanie	30	3	-
Catalpa v. Wolf	Indian Bean	Catalpa, Bois trompette	Trompetenbaum	30	5	-
Ceanothus L.	Ceanothus	Ceanothe	Säckelblume	20	2	-
Ceratostigma Bunge excluding C. plumbaginoides Bunge)	Hardy Plumbago	Dentelaire	Bleiwurz	20	2	-
Cercidiphyllum Sieb. et Zucc.	Katsura Tree	Katsura	Katsurabaum	30	3	-
Cercis L.	Judas Tree	Gainier, Arbre de Judée	Judasbaum	30	3	-
Chaenomeles Lindl. (Cydonia)	Flowering Quince	Cognassier du Japon	Japanische Quitte	20	-	-
Chimonanthus Lindl.	Winter Sweet, Japanese Allspice	Chimonanthe	Winterblüte	30	5	-
Choisya Kunth	Mexican Orange	Oranger du Mexique	Orangenblume	25	3	-
Cistus L.	Rock Rose	Ciste	Zistrose	20	2	-
Clematis L. (excluding C. heracleifolia DC.	Clematis	Clématite	Waldrebe	20	2	-
Clethra acuminata Michx.	White Alder	-	-	20	2	-
Clethra alnifolia L.	Sweet Pepper Bush	-	-	20	2	-
Clethra barbinervis Sieb. et Zucc.	-	-	-	20	2	-
Clethra fargesii Franch.	-	-	-	20	2	-
Clethra tomentosa Lam.	-	-	-	20	2	-
Cornus alba L.	Dogwood, Red Barked Dogwood	Cornouiller blanc	Weisser Hartriegel	20	2	-
Cornus controversa Hemsl.	-	Cornouiller	-	30	5	-
Cornus florida L.	Flowering Dogwood	Cornouiller à fleur	Blumenhartriegel	30	5	-
Cornus kousa (Buerger ex Miq.) Hance	-	Cornouiller	-	30	5	-
Cornus mas L.	Cornelian Cherry	Cornouiller mâle	Kornelkirsche, Dirlitze	30	5	-
Cornus nuttallii Audub.	-	Cornouiller	-	30	5	-
Corylopsis Sieb. et Zucc.	Corylopsis, Winter Hazel	Corylopsis	Scheinhasel	25	3	-
Cotinus Mill. (Rhus L. in part)	Smoke Tree	Arbre à perruque	Perückenstrauch	20	2	-
Cotoneaster (B. Ehrh.) Medik.	Cotoneaster	Cotoneaster	Cotoneaster	20	2	5
Crataegus L.	Hawthorn	Aubépine	Weissdorn	30	3	-
Cytisus L. excluding C. canariensis Steud. and C. fragrans Lam.	Broom	Genêt	Geissklee	20	2	5

Latine	English	Français	Deutsch	A	B	C
Daboecia D. Don	Saint Dabeoc's Heath	Daboécie	Irische Heide	25	3	-
Daphne L.	Daphne	Daphné	Seidelbast	30	5	-
Deutzia Thunb.	Deutzia	Deutzia	Deutzie	20	2	5
Diervilla Mill.	Diervilla	Weigela	Weigelie	20	2	5
Elaeagnus L.	Elaeagnus	Chalef	Oelweide	25	3	-
Embothrium J.R. et G. Forst.	Chilean Fire Bush	Embothrium	Embothrium, Prachtstrauch	30	5	-
Enkianthus Lour.	Enkianthus	Enkianthus	Prachtglocke	30	5	-
Erica arborea L.	Tree Heath	Bruyère arborescente	Baumheide	25	3	5
Erica australis L.	Spanish Heath	Bruyère	-	25	3	5
Erica carnea L.	Spring Heath	Bruyère d'hiver, Bruyère des neiges	Schneeheide	25	3	5
Erica ciliaris L.	Dorset Heath	Bruyère ciliée	-	25	3	5
Erica cinerea L.	Bell Heather, Scotch or Grey Heath	Bruyère cendrée	Graue Heide	25	3	5
Erica X darleyensis Bean	-	Bruyère	-	25	3	5
Erica lusitanica Rud.	-	Bruyère	-	25	3	5
Erica mackaiana Bab.	-	Bruyère	-	25	3	5
Erica mediterranea hort.	Biscay Heath	Bruyère de la Méditerranée	Mittelmeerheide	25	3	5
Erica X praegeri Ostenf.	-	Bruyère	-	25	3	5
Erica scoparia L.	Besom Heath	Bruyère à balai	-	25	3	5
Erica terminalis Salisb.	-	Bruyère	-	25	3	5
Erica tetralix L.	Cross-leaved Heath	Bruyère à quatre angles	Moorheide	25	3	5
Erica vagans L.	Cornish Heath	Bruyère vagabonde	-	25	3	5
Erica X veitchii Bean	-	Bruyère	-	25	3	5
Erica X watsonii Benth.	-	Bruyère	-	25	3	5
Erica X williamsii Druce	-	Bruyère	-	25	3	5
Escallonia Mutis ex L. f.	Escallonia	Escallonia	Escallonia	20	2	-
Eucalyptus L'Hérit.	Eucalyptus	Eucalyptus	Eukalyptus	30	5	5
Eucryphia cordifolia Cav.	-	-	-	30	5	-
Eucryphia glutinosa (Poepp. et Endl.) Baill.	-	-	-	30	5	-
Eucryphia X intermedia Bausch	-	-	-	30	5	-
Eucryphia X nymansensis Bausch	-	-	-	30	5	-
Euonymus L.	Spindle Tree	Fusain	Pfaffenhütchen, Spindelstrauch	20	2	-

Latine	English	Français	Deutsch	A	B	
Exochorda Lindl.	Pearlbush	Exochorda	Perlbusch, Prunkspiere	20	2	·
Fagus L.	Beech	Hêtre	Buche	30	5	·
X Fatshedera Guillaumin		Fatchedera	Bastardaralie	30	5	·
Forsythia Vahl	Forsythia, Golden Bell	Forsythia	Forsythie, Goldflieder, Goldglöckchen	20	2	
Fraxinus L.	Ash	Frêne	Esche	30	3	·
Fuchsia magellanica Lam. var. macrostemma (Ruiz et Pavon) Munz	Fuchsia	Fuchsia arbustif	Fuchsie	20	2	·
Fuchsia magellanica Lam. var. 'Riccartonii'	Fuchsia	Fuchsia arbustif	Fuchsie	20	2	·
Garrya elliptica Douglas ex Lindl.	Silk-tassel Tree	-	Becherkätzchen	25	3	·
Garrya X thuretii Carr.	Silk-tassel Tree	-	Becherkätzchen	25	3	·
X Gaulnettya W.J. Marchant	Gaulnettya	Gaulnettya	Gaulnettya	25	3	·
Gaultheria Kalm ex L.	Wintergreen	Gaultheria	Scheinbeere	25	3	·
Genista L.	Broom	Genêt	Ginster	20	2	·
Gleditsia L.	Honey Locust	Gleditsia, Gleditschia, Févier	Christusdorn	30	3	·
Halesia J. Ellis ex L.	Snowdrop Tree, Silver-bell Tree	Halesia, Arbre aux cloches d'argent	Schneeglöckchen-baum	20	2	-
Hamamelis L.	Witch-hazel	Hamamélis	Zaubernuss	30	3	
Hebe Comm. ex Juss. excluding H. speciosa (Cunn.) Cockayne et Allan	Shrubby Speedwell	Véronique	Strauchveronika	20	2	-
Hedera L.	Ivy	Lierre	Efeu	20	2	-
Helianthemum Mill.	Sun Rose	Hélianthème	Sonnenröschen	20	2	-
Hibiscus sinosyriacus Bailey	-	Hibiscus	Eibisch	25	3	-
Hibiscus syriacus L.	Tree Mallow	Hibiscus	Roseneibisch	25	3	-
Hoheria A. Cunn. (Plagianthus, Gaya)	Twinebark	Gaya	-	30	5	-
Hydrangea L.	Hydrangea	Hortensia	Hortensie	20	2	
Hypericum L.	Rose of Sharon, Saint John's Wort	Millepertuis	Johanniskraut	20	2	-
Ilex X altaclarensis (Loudon) Dallim.	Holly	Houx	Ilex, Stechpalme	30	5	
Ilex aquifolium L.	Common Holly	Houx	Ilex, Stechpalme	30	5	
Indigofera amblyantha Craib	Indigo	Indigo	Indigostrauch	20	2	-
Indigofera gerardiana (Wall.) Baker	Indigo	Indigo	Indigostrauch	20	2	-
Indigofera hebepetala Benth. ex Baker	Indigo	Indigo	Indigostrauch	20	2	-
Indigofera incarnata (Willd.) Nakai	Indigo	Indigo	Indigostrauch	20	2	-
Indigofera kirilowii Maxim. ex Palibin	Indigo	Indigo	Indigostrauch	20	2	-
Indigofera potaninii Craib	Indigo	Indigo	Indigostrauch	20	2	-

Latine	English	Français	Deutsch	A	B	C
Indigofera pseudotinctoria Matsum.	Indigo	Indigo	Indigostrauch	20	2	-
Jasminum beesianum Forr. et Diels	Jasmine	Jasmin	Jasmin	20	2	-
Jasminum grandiflorum L.	Spanish Jasmine	Jasmin d'Espagne, Jasmin d'Italie	Malabarjasmin	20	2	-
Jasminum humile L. (including J. wallichianum Lindl.)	Italian Jasmine	Jasmin	Jasmin	20	2	-
Jasminum nudiflorum Lindl.	Winter Jasmine	Jasmin d'hiver	Winterjasmin	20	2	-
Jasminum officinale L.	Common Jasmine	Jasmin blanc, Jasmin commun	Jasmin	20	2	-
Jasminum X stephanense Lemoine	Jasmine	Jasmin	Jasmin	20	2	-
Kalmia L.	Calico Bush, Mountain Laurel, American Laurel	Kalmia	Kalmie, Berglorbeer, Lorbeerrose	30	5	-
Kerria DC.	Jew's Mallow, Kerria	Corète du Japon	Kerrie, Ranunkelstrauch	20	2	5
Kolkwitzia Graebn.	Kolkwitzia	Kolkwitzia	Kolkwitzie	20	2	-
Laburnum Fabr.	Laburnum, Golden Chain	Cytise	Goldregen	30	3	-
Lavandula officinalis Chaix ex Villars	Lavender	Lavande vraie	Echter Lavendel	20	2	5
Lavandula spica Cav.	Lavender	Lavande spic, Aspic	Lavendel, Grosser Speik	20	2	5
Leptospermum scoparium J.R. et G.Forst.	Tea Tree, Manuka	-	Südseemyrte	20	2	-
Leucothoë D. Don	Leucothoë	Leucothoë	Traubenheide	25	3	-
Ligustrum L.	Privet	Troène	Liguster	20	2	5
Liquidambar L.	Sweet Gum	Liquidambar, Copalme	Amberbaum	30	3	-
Liriodendron L.	Tulip Tree	Tulipier	Tulpenbaum	30	3	-
Lithospermum L.	Gromwell	Grémil	Steinsame	20	2	-
Lonicera L.	Honeysuckle, Lonicera	Lonicéra, Chèvrefeuille	Heckenkirsche, Geissblatt	20	2	-
Lupinus L.	Lupin	Lupin	Lupine	25	3	-
Magnolia L.	Magnolia	Magnolia	Magnolie	30	5	5
X Mahoberberis C.K. Schneid.	Mahoberberis	Mahoberberis	Mahoberberis	25	3	-
Mahonia acanthifolia G. Don	Mahonia	Mahonia	Mahonie	25	3	-
Mahonia aquifolium (Pursh) Nutt.	Oregon Grape	Mahonia commun, Mahonia à feuilles de houx	Mahonie	25	3	-
Mahonia bealei (Fortune) Carr.	Mahonia	Mahonia	Mahonie	25	3	-
Mahonia japonica (Thunb.) DC.	Mahonia	Mahonia	Mahonie	25	3	-
Mahonia lomariifolia Takeda	Mahonia	Mahonia	Mahonie	25	3	-
Mahonia pumila (Greene) Fedde	Mahonia	Mahonia	Mahonie	25	3	-

Latine	English	Français	Deutsch	A	B	C
Mahonia repens (Lindl.) G. Don	Mahonia	Mahonia	Mahonie	25	3	-
Malus Mill. excluding M. domestica Borkh. and all varieties of apple rootstocks of Malus spp.	Crab Apple, Flowering Crab	Pommier ornemental	Zierapfel	30	3	5
Menziesia Sm.	Skunkbush	Menziesia	Menziesia	25	3	-
Nothofagus Blume	Southern Beech	Hêtre antarctique	Scheinbuche	30	3	-
Olearia albida (Hook. f.) Hook. f.	Daisy Bush, Tree Daisy	Olearia	Baumaster	20	2	-
Olearia X haastii Hook. f.	Daisy Bush, Tree Daisy	Olearia	Baumaster	20	2	-
Olearia ilicifolia Hook. f.	Daisy Bush, Tree Daisy	Olearia	Baumaster	20	2	-
Olearia macrodonta Baker	Daisy Bush, Tree Daisy	Olearia	Baumaster	20	2	-
Olearia moschata Hook. f.	Daisy Bush, Tree Daisy	Olearia	Baumaster	20	2	-
Olearia nummulariifolia (Hook. f.) Hook. f.	Daisy Bush, Tree Daisy	Olearia	Baumaster	20	2	-
Osmanthus heterophyllus (G. Don) P.S. Green (Syn. O. aquifolium Sieb., O. ilicifolius Mouillef.)	Osmanthus	Osmanthus	Duftblüte	20	2	-
Paeonia L.	Paeony	Pivoine	Päonie, Pfingstrose	25	3	-
Parrotia C.A. Mey.	Parrotia	Parrotia	Parrotzie, Eisenholz	30	5	-
Parthenocissus Planch.	Virginia Creeper	Vigne vierge	Jungfernrebe, Wilder Wein	20	2	-
Passiflora caerulea L.	Passion Flower	Passiflore, Fleur de la Passion	Passionsblume	20	2	-
Pernettya Gaudich.	Arrayan	Pernettya	Torfmyrte	25	2	-
Perovskia Karelin	Russian Sage	Perovskia	Perovskia	20	2	-
Philadelphus L.	Mock Orange	Seringa	Pfeifenstrauch, Falscher Jasmin	20	2	5
Phillyrea L.	Mock Privet	Philaria	Steinlinde	20	2	-
Phlomis fruticosa L.	Common Jerusalem Sage	Phlomis ligneux	Brandkraut	20	2	-
Phormium J.R. et G. Forst.	New Zealand Flax	Lin de Nouvelle-Zélande	Neuseeländer Flachs	25	3	-
Photinia Lindl.	Photinia	Photinia	Glanzmispel	30	3	-
Pieris D. Don	Pieris	Andromède	Lavendelheide	30	5	-
Pittosporum Banks et Soland. apud Gaertn.	Pittosporum	Pittosporum	Klebsame	20	2	5
Platanus L.	Plane	Platane	Platane	30	3	-
Populus L.	Poplar	Peuplier	Pappel	30	3	-

Latine	English	Français	Deutsch	A	B	C
Potentilla fruticosa L.	Shrubby Cinquefoil	Potentille ligneuse	Strauchfingerkraut	20	2	-
Potentilla fruticosa L. var. davurica (Nestl.) Seringe (P. glabra Loddigges)	Shrubby Cinquefoil	Potentille ligneuse	Strauchfingerkraut	20	2	-
Potentilla fruticosa L. var. rigida (Wall. ex Lehm.) T.H. Wolf (P. arbuscula D. Don)	Shrubby Cinquefoil	Potentille ligneuse	Strauchfingerkraut	20	2	-
Prunus L. (decorative varieties only) other than varieties of the Prunus species expressly referred to elsewhere in this column	Prunus (decorative varieties only) other than varieties of the Prunus species below	Prunus (variétés ornementales seulement) sauf les variétés des espèces de Prunus ci-dessous	Prunus (nur Ziersorten), mit Ausnahme der Sorten der nachfolgend angegebenen Prunus-Arten	30	3	5
Prunus X amygdalo-persica (Weston) Rehd.	-	Amandier-pêcher	-	30	3	5
Prunus X cistena N.E. Hansen	-	-	-	20	2	-
Prunus concinna Koehne	-	-	-	20	2	-
Prunus glandulosa Thunb.	Almond Cherry	Amandier à fleurs du Japon	-	20	2	-
Prunus laurocerasus L.	Cherry-laurel	Laurier-cerise	Kirschlorbeer	20	2	5
Prunus lusitanica L.	Portugal Laurel	Laurier du Portugal	Portugiesischer Kirschlorbeer	20	2	5
Prunus maritima Wangenh.	Beach-plum	Prunier des grèves	Strandpflaume	20	2	-
Prunus prostrata Labill.	Rock Cherry	-	-	20	2	-
Prunus tenella Batsch	Russian Almond	Amandier nain de Russie	Zwergmandel	20	2	-
Prunus triloba Lindl.	-	Prunier à trois lobes	Mandelröschen	20	2	5
Pyracantha M.J. Roem.	Firethorn	Pyracantha, Buisson ardent	Feuerdorn	20	2	5
Pyrus L. (decorative varieties only)	Ornamental Pear	Poirier ornemental	Zierbirne	30	3	-
Quercus L.	Oak	Chêne	Eiche	30	5	5
Rhamnus L.	Buckthorn	Nerprun	Kreuzdorn	30	3	-
Rhus L.	Sumach	Sumac	Sumach, Essigbaum	20	2	-
Ribes L. (decorative varieties only)	Ornamental Currant	Groseillier ornemental	Zierjohannisbeere	20	2	-
Robinia L.	False Acacia	Robinier	Robinie	30	3	-
Romneya Harv.	Romneya	Romneya	Romneya	20	2	-
Rosmarinus officinalis L.	Rosemary	Romarin officinal	Rosmarin	20	2	-
Rubus L. (decorative varieties only)	Ornamental Bramble	Ronce ornementale	Zierbrombeere	20	2	-
Ruta L.	Rue	Rue	Raute	20	2	-
Salix L.	Willow	Saule	Weide	30	3	5
Salvia officinalis L.	Common Sage	Sauge	Echter Salbei	20	2	5

Latine	English	Français	Deutsch	A	B	C
Sambucus L.	Elder	Sureau	Holunder	20	2	-
Sarcococca Lindl. excluding S. saligna Muell.	Sarcococca	Sarcococca	Sarcococca	20	2	-
Senecio laxifolius J. Buchan.	-	-	Kreuzkraut	20	2	-
Skimmia Thunb.	Skimmia	Skimmia	Skimmia	25	3	-
Sophora L.	Sophora, Pagoda Tree	Sophora	Schnurrbaum	30	3	-
Sorbus L.	Mountain Ash, Rowan, Whitebeam	Sorbier	Eberesche, Mehlbeere, Elsbeere	30	3	5
Spartium L.	Spanish Broom	Genêt d'Espagne	Binsenginster	20	2	-
Spiraea L.	Bridal Wreath, Spirea	Spirée	Spierstrauch	20	2	5
Stachyurus Sieb. et Zucc.	Stachyurus	Stachyurus	Stachyurus	25	3	-
Staphylea L.	Bladder Nut	Staphylier	Pimpernuss	20	2	-
Stephanandra Sieb. et Zucc.	Stephanandra	Stephanandra	Kranzspiere	20	2	-
Stewartia L.	Stewartia	Stewartia	Scheinkamelie	30	3	-
Stranvaesia Lindl.	Stranvaesia	Stranvaesia	Stranvaesie	30	5	-
Styrax L.	Styrax, Storax, Snowbell	Aliboufier	Storaxbaum	25	3	-
Symphoricarpos Duham.	Snowberry	Symphorine	Schneebeere	20	2	5
Syringa L. excluding S. velutina Komar. (S. palabiniana Nakai)	Lilac	Lilas	Flieder	20	2	5
Syringa velutina Komar. (S. palabiniana Nakai)	Lilac	Lilas	Flieder	30	5	-
Tamarix L.	Tamarisk	Tamaris	Tamariske	20	2	-
Teucrium fruticans L.	Tree Germander	Germandrée ligneuse	-	20	2	-
Tilia L.	Lime	Tilleul	Linde	30	3	-
Ulex L.	Gorse	Ajonc	Stechginster	20	2	-
Ulmus L.	Elm	Orme	Ulme	30	3	-
Vaccinium L. (decorative varieties only)	-	-	-	30	5	-
Viburnum L.	Snowball Tree	Viorne	Schneeball	20	2	-
Vinca major L.	Larger Periwinkle	Grande pervenche	Immergrün, Singrün	20	2	-
Vinca minor L.	Lesser Periwinkle	Petite pervenche	Immergrün	20	2	-
Vitis L.	Vine	Vigne	Rebe	20	2	-
Weigela Thunb.	Diervilla	Weigela	Weigelie	20	2	5
Wisteria Nutt.	Wisteria	Glycine	Glyzine, Wistarie	30	5	-
Yucca L. excluding Y. aloifolia L., Y. baccata Torr. and Y. whipplei Torr.	Yucca	Yucca	Palmlilie	30	5	-
Zelkova Spach	Zelkova	Orme du Caucase	Zelkove	30	3	-

7. CONIFER AND TAXADS / CONIFERES ET TAXALES / NADELHOELZER UND EIBENGEWAECHSE

Latine	English	Français	Deutsch	A	B	C
Coniferae (Coniferales)	Conifers	Conifères	Nadelhölzer	30	5	-
Exceptions /Ausnahmen						
- Abies Mill.	Fir	Sapin	Tanne	30	3	-
- Cedrus Trew.	Cedar	Cèdre	Zeder	30	3	-
- Chamaecyparis Spach	Chamaecyparis	Chamaecyparis	Scheinzypresse	30	5	6
- X Cupressocyparis Dallimore	-	-	-	30	5	6
- Cupressus L.	Cypress	Cyprès	Zypresse	30	5	6
- Picea A. Dietr.	Spruce	Epicéa	Fichte	30	3	-
- Pinus L.	Pine	Pin	Kiefer	30	3	-
- Pseudotsuga Carr.	Douglas Fir	Sapin de Douglas	Douglasie	30	3	-
- Thuja L.	Thuya	Thuya	Lebensbaum	30	5	6
- Tsuga Carr.	Hemlock	Tsuga	Hemlockstanne, Schierlingstanne	30	3	6
Taxales	Taxads	Taxales	Eibengewächse	30	5	-
Exceptions /Ausnahmen						
- Taxus L.	Yew	If	Eibe	30	3	6

Sweden

By virtue of the Law of May 9, 1985 (SFS 1985 : 262 of May 22, 1985), Amending the Plant Breeders' Rights Law (1971 : 392), protection was extended, with effect from July 1, 1985, to the following (the Latin and Swedish names appear in the Law, whereas the English, French and German common names have been added, without guarantee of concordance, by the Office of the Union):

Latine	Svensk	English	Français	Deutsch
Triticosecale Wittmack	Ragvete	Triticale	Triticale	Triticale
Triticum turgidosecale	Ragvete	Triticale	Triticale	Triticale

Concerning the availability of protection to foreigners, reference is made to s governed by Article 2 of the Plant Breeders' Rights Law of May 27, 1971, as last amended by the above mentioned Law published in the "Legislation" subsection of the "Newsletter" section, starting on page 25.

Pursuant to Article 21 of the above-mentioned Law, the duration of protection is 20 years, computed from the beginning of the year following that in which the decision on the registration of a plant breeder's right gains force of law.

An updated extract of the list of taxa covered by plant variety protection legislation is given below, on pages 27 and 28, with the same proviso as above.

NEWSLETTER

MEMBER STATES

France: Modification of Fees

By Order of June 25, 1985 (Journal officiel of July 16, 1985), on the Tariff of Fees Charged in Respect of Plant Variety Protection, the fees for the examination of the application have been amended with effect from July 16, 1985. Some details of the fee tariff as presently in force are given (in French francs) in the table below.

Type of Fee / Crops	A	B	C
1. Fees charged in connection with the issuing of a new plant variety certificate			
- at the filing of the application	350	350	300
- at the issuing of the certificate	250	250	200
- where the denomination does not appear in the application	250	250	250
- change of denomination	200	200	200
- priority claim	200	200	200
2. Fees for the examination of the application			
- in case of test growings: per year	2330	2330	1295
- in the case of streamlined tests*	777	777	777
- where no test growings are made in France: amount of the examination fee, as charged by the foreign service,** and	120	120	120
3. Annual maintenance fee			
- First annuity	250	150	100
- Second annuity	350	200	100
- Third annuity	450	250	200
- Fourth annuity	600	300	200
- Fifth annuity	750	400	300
- Subsequent annuities	900	600	300

A: Agricultural crops except flax and rice, horticultural and vegetable crops, ornamental plants mainly grown for cut flowers

B: Fruit and forest trees, berry and soft fruit shrubs, lavender, flax, rice, vine

C: Ornamental plants and shrubs grown only for the garden or in pots

* The reduced fee of 777 francs is charged in the case where the Committee for the Protection of New Plant Varieties decides to have recourse to a test procedure limited to a list of characteristics established in advance, species by species, for varieties of mutational origin.

** That fee corresponds either to the examination fee of the examining authority if it has no examination results available for the variety or to a purchase fee for results already available. Where the applicant has already applied for protection and paid the corresponding examination fees to that foreign examining authority, he still must pay, in connection with the application in France, the fees mentioned in the relevant item of the table above, but the amount of the examination fee will be collected as an advance payment on annual fees, without reimbursement, however, in case of abandonment of protection. The fees mentioned in the table above are also due in the event of withdrawal of the application if the procedure for requesting examination results from a foreign authority has already been initiated.

[This page replaces the corresponding page published in issue No. 42]

SWEDEN

Plant Breeders' Rights Law*

Consolidated Text of the Law of May 27, 1971,
as Amended by the Law of June 30, 1971, the Law of August 24, 1977,
the Law of November 10, 1982, and the Law of May 9, 1985**

General Provisions

Article 1

This Law shall apply to plant varieties which belong to the plant genera or plant species indicated in the annex to this Law.

Article 2

A breeder who has created a plant variety in the country, or his successor in title, may obtain through registration the exclusive right to commercially exploit the variety in accordance with this Law (plant breeder's right).

A breeder who is a Swedish national or is domiciled in Sweden, or such a breeder's successor in title, may acquire a plant breeder's right also in respect of a variety which has been created abroad.

A plant breeder's right may also be acquired

1. by a breeder who has created a plant variety in a foreign State which is bound by the Convention of December 2, 1961, for the Protection of New Varieties of Plants, or by such a breeder's successor in title.

2. by a breeder who is a national of or is domiciled in such a State and who has created a plant variety abroad in a case other than the one mentioned under 1, or by such a breeder's successor in title.

A plant breeder's right may be acquired in still another case, if the Government considers that it is of significant interest for Swedish food supply or for Swedish plant growing.

Article 3

A plant variety shall be registered only if

1. by at least one important characteristic it clearly differs from any other variety that has become known before the date of the application for registration,

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* Swedish title (of the Law of May 27, 1971): Växtförädlarrättslag

** Consolidated text prepared by the Office of the Union from the texts published in the Svensk författningssamling:

Law of May 27, 1971: SFS 1971 : 392 of June 23, 1971
Law of June 30, 1971: SFS 1971 : 628 of July 27, 1971
Law of August 24, 1977: SFS 1977 : 703 of September 13, 1977
Law of November 10, 1982: SFS 1982 : 991 of December 7, 1982
Law of May 9, 1985: SFS 1985 : 262 of May 22, 1985

2. it is sufficiently uniform (homogeneous), having regard to the particular features of its sexual or vegetative propagation,

3. after propagation made in accordance with the method of propagation indicated by the breeder, it is consistent (stable) in its essential characteristics.

A plant variety shall be deemed known if material thereof has been commercially offered for sale or otherwise made available, or if it has been the subject of an entry in an official list of varieties or of an application therefor, if it appears in a reference collection accessible to the public, if it has been the subject of a precise description in written matter accessible to the public, or if it has otherwise come to the knowledge of the public.

Registration may not take place if plant material of the variety has been commercially put into the trade with the consent of the breeder or of his successor in title,

1. in the country before the date of the application for registration,

2. abroad more than six years before the date of the application, this applying to vine, fruit trees, forest trees, ornamental trees and their rootstocks,

3. abroad more than four years before the date of the application, this applying to any plant other than those referred to in 2 above.

Article 4

A plant breeder's right shall imply that, subject to the exceptions provided for below, any person other than the owner of the plant breeder's right (variety owner) may not commercially exploit the plant variety without the latter's permission

1. by producing or importing into the country plant material of the variety with the aim of offering the material for sale for propagation purposes or of otherwise making it available for such purposes,

2. by offering for sale or otherwise making plant material of the variety available for propagation purposes,

3. in the case where the repeated use of plant material of the variety is necessary for the production of plant material of another variety, by using plant material of the variety for such production and with the aim of offering the material so produced for sale for propagation purposes or of otherwise making it available for such purposes.

With respect to ornamental plants, the plant breeder's right shall also imply that any person other than the variety owner may not use without the latter's permission plants or parts of plants as propagating material for the commercial production of cut flowers or other material intended for ornamentation.

Article 5

Where a plant variety has been the subject of an application for protection in a State which is bound by the Convention of December 2, 1961, for the Protection of New Varieties of Plants and where registration of the plant variety is applied for in the country within twelve months from the date on which the application was made in the foreign State (priority period), the application filed in the country shall be deemed, for the purposes of Article 3, first paragraph, subparagraph 1, and third paragraph, to have been made on the same date as the application in the foreign State, if the applicant so requests. Such priority may also be enjoyed on the basis of an application for protection relating to another foreign State, if an equivalent priority

[This page replaces the corresponding page published in issue No. 42]

Latine	Svensk	English	Français	Deutsch
Festuca spp.	Svingel	Fescue	Fétuque	Schwingel
Glycine max (L.) Merrill	Sojaböna	Soya Bean, Soybean	Soja	Sojabohne
Helianthus annuus L.	Solros	Common Sunflower	Tournesol, Soleil	Sonnenblume
Hordeum vulgare L.	Korn	Barley	Orge	Gerste
Linum usitatissimum L.	Lin	Flax, Linseed	Lin	Lein
Lolium spp.	Rajgräs	Ryegrass	Ray-grass	Weidelgras
Lupinus angustifolius L.	Blalupin	Blue Lupin	Lupin bleu	Blaue Lupine
Lupinus luteus L.	Gullupin	Yellow Lupin	Lupin jaune	Gelbe Lupine
Medicago spp.	Lusern	Alfalfa, Lucerne	Luzerne	Schneckenklee
Ornithopus sativus Brot.	Seradella	Serradella	Serradelle	Serradella
Papaver somniferum L.	Vallmo	Opium Poppy	Oeillette, Pavot	Mohn
Phalaris arundinacea L.	Rörflen	Reed Canary Grass	Alpiste roseau	Rohrglanzgras
Phaseolus vulgaris L.	Böna	French Bean	Haricot	Gartenbohne
Phleum spp.	Timotej	Timothy	Fléole	Lieschgras
Pisum sativum L.	Art	Pea	Pois	Erbse
Poa spp.	Gröe	Meadow-grass	Pâturin	Rispengras
Secale cereale L.	Rag	Rye	Seigle	Roggen
Sinapis alba L.	Vitsenap	White Mustard	Moutarde blanche	Weisser Senf
Solanum tuberosum L.	Potatis	Potato	Pomme de terre	Kartoffel
Trifolium hybridum L.	Alsikeklöver	Alsike Clover	Trèfle hybride	Schwedenklee
Trifolium pratense L.	Rödklöver	Red Clover	Trèfle violet	Rotklee
Trifolium repens L.	Vitklöver	White Clover	Trèfle blanc	Weissklee
Triticosecale Wittmack	Ragvete	Triticale	Triticale	Triticale
Triticum aestivum L. emend. Fiori et Paol.	Vete	Wheat, Soft Wheat, Bread Wheat	Blé tendre, Froment	Weichweizen
Triticum durum Desf.	Makaronivete	Durum Wheat, Macaroni Wheat, Hard Wheat	Blé dur	Hartweizen
Triticum turgidosecale	Ragvete	Triticale	Triticale	Triticale
Vicia faba L. var. minor Harz	Akerböna	Field Bean, Tick Bean	Féverole	Ackerbohne
Vicia sativa L.	Fodervicker	Common Vetch	Vesce commune	Saatwicke
Vicia villosa Roth	Luddvicker	Hairy Vetch	Vesce velue	Zottelwicke
Zea mays L.	Majs	Maize	Maïs	Mais

B. Trädgardsväxter / Horticultural Crops / Plantes horticoles / Gartenbauliche Pflanzen

1. Köksväxter / Vegetables / Plantes potagères / Gemüsepflanzen

Latine	Svensk	English	Français	Deutsch
Allium spp.	Lök	-	-	Lauch
Anethum graveolens L.	Dill	Dill	Aneth	Dill
Apium graveolens L.	Selleri	Celery, Celeriac	Céleri, Céleri-rave	Sellerie
Asparagus officinalis L.	Sparris	Asparagus	Asperge	Spargel
Beta vulgaris L. ssp. vulgaris var. conditiva Alef.	Rödbeta	Garden Beet, Beetroot	Betterave rouge, Betterave potagère	Rote Rübe
Brassica napus L. var. napobrassica (L.) Rchb.	Kalrot	Swede	Chou-navet, Rutabaga	Kohlrübe
Brassica oleracea L.	Kal	Brassica vegetables	Choux maraîchers	Gemüsekohl
Capsicum annuum L.	Paprika	Sweet Pepper, Capsicum, Chili	Poivron, Piment	Paprika
Cucumis melo L.	Melon	Melon	Melon	Melone
Cucumis sativus L.	Gurka	Cucumber, Gherkin	Concombre, Cornichon	Gurke
Daucus carota L.	Morot	Carrot	Carotte	Möhre
Glycine max (L.) Merrill	Sojaböna	Soya Bean, Soybean	Soja	Sojabohne
Lactuca sativa L.	Sallat	Lettuce	Laitue	Salat
Lycopersicon esculentum P. Mill.	Tomat	Tomato	Tomate	Tomate
Pastinaca sativa L.	Palsternacka	Parsnip	Panais	Pastinak
Petroselinum crispum (Mill.) Nym. ex A. W. Hill	Persilja	Parsley	Persil	Petersilie
Phaseolus vulgaris L.	Böna	French Bean	Haricot	Gartenbohne
Pisum sativum L.	Art	Pea	Pois	Erbse
Raphanus sativus L. var. niger (Mill.) S. Kerner	Rättika	Black Radish	Radis d'été, d'automne et d'hiver	Rettich
Raphanus sativus L. var. radicula Pers.	Rädisa	Radish	Radis de tous les mois	Radieschen
Spinacia oleracea L.	Spenat	Spinach	Epinard	Spinat
Vicia faba L. var. major Harz	Bondböna	Broad Bean, Horse Bean	Fève	Dicke Bohne (Puffbohne)
Zea mays L.	Majs	Maize	Maïs	Mais

CASE LAW

New Zealand: 'Apollo' and 'Gemini' (Compulsory Licences) Case

On January 16, 1985, the Plant Varieties Appeal Authority constituted under the Plant Varieties Act 1973 delivered a ruling upon an appeal against a decision of the Registrar of Plant Varieties to issue compulsory licences. In brief, the Appeal Authority confirmed the view of the Registrar that by making reproductive material of 'Apollo' and 'Gemini' available to commercial feijoa growers and not to home gardeners, the holder of the plant selectors' rights failed to meet its obligation under the Act of making reproductive material of the varieties concerned available to the public. The decision is reproduced below in a somewhat abridged version.

This appeal was heard at Christchurch on 1 October 1984 and Decision reserved. The appeal is not by way of rehearing...

Section 22(2) makes provision for the Minister to impose such restrictions on the exercise of those rights as he thinks fit.

...

The important section for the purposes of this appeal is Section 23 of the Act. This section deals with the obligations of the grantee and compulsory licences. Section 23 imposes upon the holder of a plant selectors' right the obligation to ensure that plants of reasonable quality and variety to which the grant relates are available to the public in reasonable quantities and at a reasonable price.

Further in Subsection (2) of Section 23, if the Registrar of Plant Varieties, upon the application of any person, considers that the foregoing provisions have not been complied with by the holder of any grant, and after the Registrar has done whatever may be practicable to give the holder notice of the application and an opportunity of being heard, the Registrar may issue the applicant a compulsory licence for the reproduction and sale of plants of the variety to which the grant of plant selectors' rights relates, subject to special conditions as the Registrar may impose, including the payment of the royalty. Section 25 makes provision for the Appeal Authority and Section 26 creates the right of appeal to that Authority.

...

The Tribunal has already noted that the appeal is not by way of rehearing, and accepts the submission of Mr. Pankhurst, counsel for the Registrar, that although the Act describes the present hearing as an Appeal, the Act clearly indicates that to use his expression an "investigation de novo" is intended upon the hearing of an appeal. ... With that submission Mr. Maguire, counsel for the appellant, is not in disagreement.

It was also submitted by Mr. Pankhurst that whilst the appeals are investigations de novo nevertheless policies and practices followed by the Registrar of plant varieties and reflected in his decision should be of at least persuasive influence before this Tribunal. The Tribunal is in agreement with that submission and is of the view that the Tribunal should not lightly decline to follow or disagree with the decision or reasons advanced by the Registrar because of the specialised nature of his work and function. The Tribunal however emphasises that the reasons advanced by the Registrar of Plant Varieties for his decision are persuasive only and not binding on this Tribunal.

The Tribunal finds that the Division of Horticulture and Processing of the Department of Scientific and Industrial Research, through a member of staff, Mr. Paterson, did work in Feijoas and as a result of his work two plants, one identified as A26 and later named 'Apollo' and another plant identified as A32 and later named 'Gemini', were selected from two properties at Kerikeri. The Division of Horticulture and Processing decided in 1981 to seek plant selectors' rights for 'Apollo' and 'Gemini' and the necessary procedures for such were instituted. Plant selectors' rights were granted in full for both cultivars 'Apollo' and 'Gemini' on 21 March 1983.

In May 1983 at the Mount Albert Research Centre, representatives of the Department of Scientific and Industrial Research and managers of certain licensed nurseries attended by invitation and at that meeting agreement was reached on matters such as selling price, royalty level, labelling and general policy. It was agreed the commercial fruit growers should be given the first opportunity to obtain plants before home gardeners and that new licensed nurseries should not be added without mutual agreement between DSIR and the persons entitled to royalties. Following that meeting limited quantities of plant material were made available to the licensed nurseries and their performance as propagators is accepted as good and adequate plants became available in a relatively short time. As at the date of hearing of the Appeal the Tribunal finds that plants of both varieties were currently freely available from urban garden centres in and around Auckland. The tribunal finds that of the six licensed nurseries all were approached by non commercial fruit growers for plants of the two varieties 'Apollo' and 'Gemini'. Only two met requests for the supply of the cultivars and the other four licensed nurseries declined practically every such request. The reason for such declinatory was given by four of the six nurseries as being the policy of the Department of Scientific and Industrial Research.

The Tribunal having regard to the evidence tendered considered by it finds that sufficient plants of the two varieties were available to enable the Department of Scientific and Industrial Research, Division of Horticulture and Processing, to have complied with the obligation imposed on it by the statute to ensure that plants of reasonable quality of the variety to which the grant related were available to the public in reasonable quantities and at a reasonable price.

Duncan and Davies Limited having had their request for a supply of plants of both cultivars refused by the holder of the plant selectors' rights applied to the Registrar of Plant Varieties for a compulsory licence, on the specific ground that the Department of Scientific and Industrial Research, Division of Horticulture and Processing, by making reproductive material of 'Gemini' and 'Apollo' available only to commercial fruit growers and not to homegardeners failed to meet its obligation as a holder of plant selectors' rights under Section 23 of the Act to ensure that plants of reasonable quality of the variety to which the grant relates are available to the public in reasonable quantities and at a reasonable price.

The Tribunal has considered the decision of the Registrar of Plant Varieties in respect of the application for the compulsory licences for the Feijoa varieties 'Gemini' and 'Apollo'. It is the view of the Tribunal that the Registrar has acted properly and in accordance with the obligations imposed upon them in the statute in considering the application for compulsory licences and the particulars he has afforded the appellant and the respondent herein for making representations and offering a hearing which opportunity as to hearing was not accepted by either party. The Tribunal notes that the Registrar gave his attention to the word "public"* as used in Section 23 and further that he turned his mind to the time when Section 23 requires the holder of plant selectors' rights to make the protected variety available to the public whether or not the Section allows the holder of plant selectors' rights a period of grace.

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* 6.1 The meaning of the word "public" as used in Section 23 is important. I agree with both parties that the word should be interpreted to mean the public of New Zealand. I would add that within this geographical restriction the word should be interpreted in the widest sense; surely a holder of PSR would be failing to meet his obligations if he did not supply a reasonable quantity of plants to a definable sector of the public even though he may be supplying a reasonable quantity to the rest of the public.

7.1 In point 5 of the DHP letter, it is contended that "the failure of this firm (D & D) to obtain plants from the present licence holders is meaningless in this context. As competing nurserymen in the trade they can hardly be regarded as "public". They are direct competitors."

7.2 There is some validity in DHP's contention and I would agree that a holder of PSR should have the right to select certain licensees or outlets and to refuse others. However this is a rather diversionary argument. The point at issue is that the law allows D & D to apply for a compulsory licence on the grounds of inadequate supply of plants to the public and to receive such a licence if the grounds for the claim are found to be substantiated.

The decision of the Registrar was dated 30 March 1984 and the Registrar noted the appellant changed in the policy of the holder of the plant selectors' rights as contained in a memorandum of 9 March 1984 when the Director of the Division of Horticulture and Processing, Department of Scientific and Industrial Reasearch, forwarded a memorandum to the six licensed nurserymen instructing them "that if any members of the general public approach you with the view to purchasing the feijoa plants, you should not unreasonably refuse them". As the Registrar correctly noted, in our view this was corrective action taken too late by the holder of the plant selectors' rights and the Registrar was considering the position at the time when the application for compulsory licences were made namely 5 January 1984.

The word "public" is not defined in the Act and accordingly it must be given its ordinary meaning and the Tribunal is of the view that the interpretation should be fair, large and liberal. The Tribunal finds that the Division of Horticulture and Processing of the DSIR which was the holder of the plant selectors' rights grant in respect of the two cultivars of feijoa under consideration did not discharge its obligations imposed upon it by Section 23 in that by confining distribution by its policy to the six licensed nurserymen it did not ensure that plants of reasonable quality of the variety to which the grant relates are available to the public in reasonable quantities and at a reasonable price, and the view of the Tribunal is that that obligation imposed under Section 23(1) comes into force immediately upon the grant of the plant selectors' rights of the Registrar of Plant Varieties. The Tribunal has taken into account the submissions made by all parties. Mr. Maguire for the appellant has compared the Act with patent legislation derived from the Statute of Monopolies passed in 1624 in England.

There is a significant difference between the New Zealand legislation and overseas legislation in the field of plant varieties and the granting of plant selectors' rights. The Registrar of Plant Varieties in his decision refers to that distinction and the Tribunal quotes from his decision at paragraph 8.1:

> "I find it pertinent to the present issue to ask the question: does Section 23 require a holder of PSR (plant selectors' rights) to make his protected variety available to the public from the date of the grant or does it in some way allow him a period of grace, or as it is sometimes called "a period of sole rights"? I note that the corresponding United Kingdom legislation, the Plant Varieties and Seeds Act 1964 (which I understand was studied and used as a model at the time the New Zealand Act was drafted), as well as the most closely related New Zealand legislation, the Patent Act 1953 (it is related in the sense that it too provides for a system of proprietary rights) - both allow a period of sole rights. The UK Act (Section 7(2)) allows for the prescribing by regulation for particular species or groups of plant varieties a period of time following the date of the grant, during which a compulsory licence will not have effect. As an example, in the case of soft fruit such as black currants and raspberries the prescribed period is two years. The New Zealand Patents Act 1953 allows application for compulsory licences only after the expiration of three years from the date of sealing a patent.
>
> "8.2 - The New Zealand Plant Varieties Act clearly differs in this regard in that it does not specify a period of sole rights. It does not even use words such as "the holder ... shall ensure that plants ... are available to the public within a reasonable period of time after the date of the grant." In the absence of any such reference, direct or indirect, I assume that it is not the intention of the Act to allow a period of sole rights and that a holder of PSR is obliged to make his variety available to the public from the date of the grant. (That there may be an insufficient quantity of plants at the time the grant is made need not necessarily be held against the holder of PSR as long as he is taking reasonable steps to produce the quantity required)."

The Tribunal is in agreement with that view expressed by the Registrar of Plant Varieties.

It is the view of the Tribunal, having regard to the opinion of the Plant Varieties Registrar as expressed in his decision as to a period of sole rights and also having regard to the submissions made at the hearing of the appeal

before the Tribunal, that consideration should be given by the appropriate authority to include in the Plant Varieties Act 1973, by way of amendment, a provision dealing with the granting of sole rights to the holder of plant selectors' rights for a specific period of say two years in which time applications for a compulsory licence should not be considered where the holder of plant selectors' rights has otherwise discharged the obligations imposed upon him by the grant.

It is the unanimous decision of the Tribunal that the appeal be disallowed. It is also the view of the Tribunal that no costs should be awarded but leave is reserved to apply further in respect of costs.

GENERAL STUDIES

Possible Types of Varieties in Rape

Gerhard Röbbelen*

1. Categories of Breeding

The genetic structure of a variety depends on the breeding method used to produce it. In sexually propagated crops, there exist three basically different types of varieties. According to **Schnell** (Z. Pflanzenzüchtung 89, 1, 1982), they may be distinguished by the type of the last propagation step occurring in seed production. That multiplication step leads to fundamental differences in the homogeneity and stability of the resulting variety.

The stability required by law can be obtained in two ways. Pure line varieties remain stable from one generation to the next. Population varieties show the same kind of stability, provided that they remain in genetic equilibrium. On the other hand, for hybrid varieties, where progenies are essentially different from their parents, the requirement of stability can only be met by producing identical seed anew each time from the corresponding stable parent lines.

Type of variety	Last propagation step	Exploitation of heterosis	Rate of heterozygosity	Progeny
1. Pure Line	Self- pollination	no	low	identical
2. Population	Open pollination	present	medium	identical
3. Hybrid	Controlled cross-pollination	high	high	different

2. Fundamentals of Rape Biology

In the natural propagation of rape, self-pollination predominates. The outcrossing rates measured (e.g. by means of marker genes) in the field vary from around 10% to over 30%. Self-sterility is rare, although it can be found; forced self-pollination (e.g. by bagging) usually yields satisfactory seedset. Progenies from selfing exhibit inbreeding effects. **Schuster** and **Michael** (Z. Pflanzenzüchtung 77, 56, 1976) determined a maximum yield depression of 45% in the I_8 generation. But they also found I-lines surpassing the performance of the original population. Crossing of appropriate lines results in heterosis that can be exploited, partially or fully, in population and hybrid varieties.

* Prof. Dr. Dr. h.c., Institute for Agriculture and Plant Breeding, University of Göttingen, Federal Republic of Germany.

For rape breeding, further characteristics of the crop are of particular importance:

- The natural outcrossing rate varies considerably depending on the genotype (i.e. on the rate of self-sterility) and the environment (outcrossing is lower in cooler, northern regions and considerably higher in warmer, southern regions).
- The breeder can control the outcrossing rate to a great extent: by forced selfing in the one direction and, for example, by using beehives in the other.
- Of particular advantage is the high rate of generative propagation (1 to 1000 and more).
- But the fact that in mixed stands different genotypes may phenotypically approximate each other to a surprisingly high degree makes breeding activities difficult.
- A start has recently been made on using the suitability of rape for modern in vitro techniques, in particular shoot embryo multiplication and microspore cultures.

3. Conventional Rape Varieties

The range of fecundation modes offers the breeder a choice of strategies. In the past, rape breeding was in the form of pedigree selection, which leads to pure line varieties in autogamous crops. In the 60's, rape breeders still believed the partial allogamy of their material could be ignored in their breeding procedures. The introduction of oligogenic quality characteristics such as the absence of erucic acid or low glucosinolate content showed that more frequent selfings were necessary to ensure the desired level of quality as readily as possible. However, this conflicts with the wish to keep some heterozygosity in the variety to exploit at least a part of the possible heterosis.

Figure 1 shows how rape varieties have been developed over the last decade in the Federal Republic of Germany. Figure 1 is of course simply a model. The duration and dimensions of the individual steps vary from case to case, depending on the original parents, the inheritance of the desired characteristics, the possible selection intensity and so on. Indeed even those breeding steps that are important for the genetic structure of the variety may be carried out in quite different ways. In Figure 1, for example, the origin of the varieties is the offspring of an F_4 plant; in the past, the origin was probably an even earlier generation (F_3). Moreover, the residual heterozygosity can be reduced by any number of additional means, e.g. by a smaller genetic distance between the parents in the original cross, a larger number of selfings or a higher selection intensity between the selected single-plant progenies. Bulking in F_7 of tested sister strains from one F_4-family, as assumed in Figure 1, is another possibility favored by those breeders who rank the benefit from some residual heterozygosity higher than the advantagess of maximum homogeneity. Last but not least, homozygosity within progenies can also be enhanced by reducing spontaneous outcrossing by an appropriate spatial rrangement of plots in the nursery, according to pedigree groups.

It thus emerges that rape varieties developed in this way are not in fact "pure lines" as meant by **Johannsen**, but rather populations that are narrowed to a greater or lesser degree. Their heterozygosity is clearly lower than that of typical population varieties of allogamous crops (e.g. rye), but also distinctly higher than that of typical line varieties of autogamous crops (e.g. wheat). This intermediate situation of rape, somewhere between typical inbreeding and typical outbreeding species, not only causes problems for both breeding and variety testing, since the correct determination of the individual variety type becomes difficult, but also means that neither recombination nor heterosis can be handled by the breeder with optimum efficiency. Breeders have therefore been intensively active for some time to remedy this disadvantage, whether it be to produce pure lines or to develop hybrid varieties.

4. Line Varieties

In principle, breeding of varieties which are genetically similar to typical line varieties is also possible with rape. To do so, the breeding schedule shown in Figure 1 needs only to be extended by a few generations of selfing. Breeding strains produced after repeated selfing from a selfed F_5

or even F_6 single plant may be considered without doubt equivalent to line varieties of a self-pollinating species; their residual heterozygosity is low. Admittedly seed multiplication (in its last propagation step, that is the decisive one, according to **Schnell**) is not by self-pollination exclusively but involves partial cross-pollination as is the usual case in rape. However, outcrossing will only occur between sister plants and will have genetic effects similar to those of self-pollination. Thus, the number of generations raised from forced selfing in the nursery is decisive for the creation of a line variety in rape.

Microspore culture, i.e. the production of homozygous plants from haploids (see **Lichter**, Z. Pflanzenphysiol. 105, 427, 1982), has offered a new procedure for the efficient creation of line varieties in rape for some years already. It enables varieties to be created as genetically pure lines even from F_1 gametes. Considering the high natural multiplication rate of rape (augmented by the possibility of *in vitro* mass propagation) and the enormous improvement of selection accuracy (by selecting exclusively from among homozygous genotypes), this procedure is extremely attractive for the future. Some line varieties of this type have already been successfully developed from spontaneously occurring haploids.

5. Hybrid Varieties

Hybrid varieties of rape have reportedly been developed in the People's Republic of China using the method first proposed by **Thompson** (5th Int. Rapeseed Conf., Malmö, Vol. 1, 56, 1978), making controlled use of self-sterility (see Figure 2), and put into large-scale cultivation. Several systems of male sterility on a cytoplasmic/genic basis are presently under research; but according to the reports given at a symposium on the topic at the 6th Int. Rapeseed Congress in Paris, in 1983, none of these will be available for practical breeding programs for three to five years from now (see also **Mathias**, Vortr. Pflanzenzüchtung 5, 173, 1984). Gametocides are also conceivable, but are not yet ready for use.

The controlled use of the high heterosis effect in hybrid varieties of rape will probably take at least another decade of development. In similar cases of other crops (e.g. alfalfa, grasses, etc.), breeding methods using heterosis to some extent, at least in so-called synthetic or composite varieties, have been adopted for some time already.

6. Synthetic Varieties

In terms of variety typology, synthetic varieties are to be included in the category of population varieties, since their seeds are produced by panmictic (unrestricted) pollination. They are distinguished, however, within the group of population varieties by the fact that the initial population of the final variety is composed of single defined parental strains that are put together by mixture (Figure 3A) or crossing (Figure 3B) (cf. **Geiger**, Vortr. Pflanzenzüchtung 1, 41, 1982). These strains are selected according to their general combining ability determined on the basis of the usual topcross tests. Yet, for various reasons, the desired heterosis cannot be made use of until a later generation: for genetic reasons, assuming a realistic self-pollination rate of about 70%, the maximum possible heterosis is obtained from an initial mixture not before the syn-4 generation (see Figure 3A). For technical reasons, crossing (as applied in Figure 3B) is not possible to the extent required for certified seed production. Since, according to Figure 3A, the syn-1 generation (and the following) contains not only hybrids but also parental types and, according to Figure 3B, in the case of crossing, segregations occur increasingly in the subsequent generations, synthetic varieties can never attain the homogeneity of line varieties or even hybrid varieties. The greater the diversity of the parental strains chosen to increase the chances of obtaining heterosis, the lesser the homogeneity of the varieties.

The level of performance (corresponding to the degree of heterozygosity or likelihood of heterosis) of the population equilibrium which is finally established in such synthetic varieties depends on the percentage of outcrossing (higher in the case of self-sterile parental lines) as well as--to a lesser extent--on the number of parents. As shown in Figure 3, expectations of yield are higher with n = 16 parental lines than with n = 8; in synthetic varieties with n = 2 (which have also been reported upon), such differences are likely to be much higher if they are not compensated for by their better combining ability (from among several parents one can always find the best two).

The time when the population reaches its equilibrium also depends mainly on the outcrossing rate (panmixis index, Figure 3). It is further delayed by the polyploid nature of the rape species. With s = 0.7 (Figure 3), the stability of synthetic varieties appears to be attainable in the syn-4 generation at the earliest. Since the breeder will start with controlled crossing (as in Figure 3B) for estimating the combining ability by topcross tests, he has to wait until the genetic population equilibrium has been reached before final testing of the performance of his synthetic variety. An earlier prediction of the "equilibrium performance" of synthetic varieties is not feasible without a large number of hardly verifiable assumptions.

Earlier syn-generations are suited for the production of certified seed only if that seed is always reproduced anew, in an identical manner, from its stable parent lines and only if the same syn-generation is used in the farmers' fields. With such controlled crossing in the multiplication of certified seed, a synthetic variety approaches the genetic status, according to the grouping of Schnell, of a hybrid variety, in which more heterosis can be utilized in the certified seed than in any later seed generation.

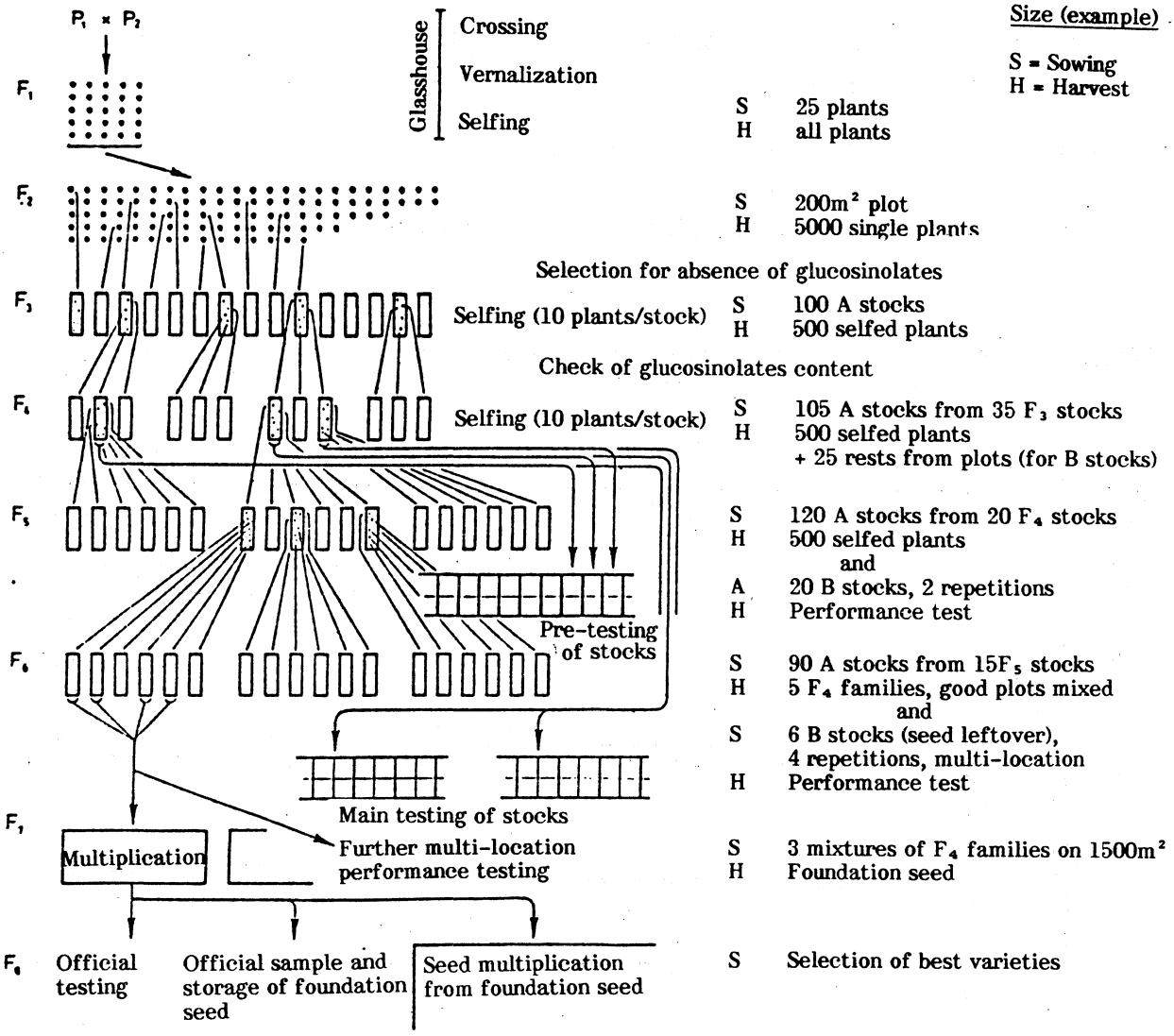

Figure 1: Model for conventional rape breeding

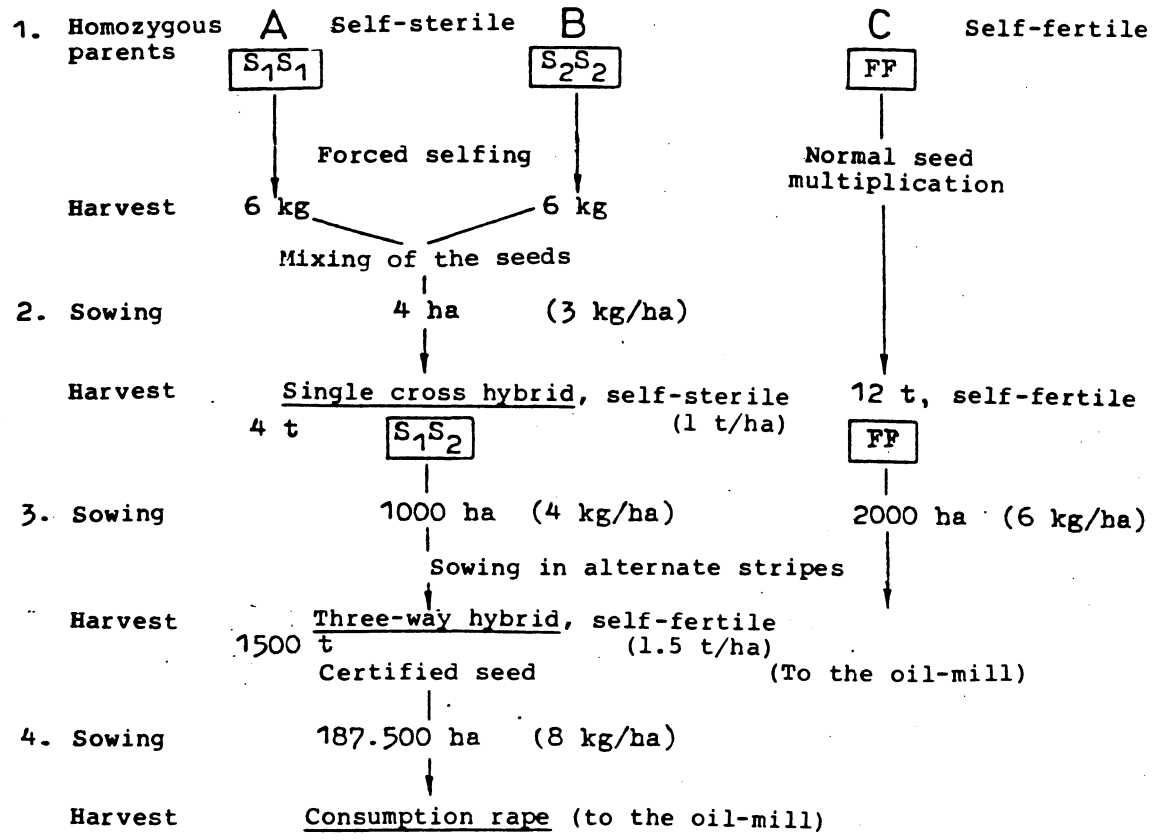

Figure 2: Model for the production of a self-fertilizing variety of a three-way hybrid of rape from two self-sterile and one self-fertile parent line.

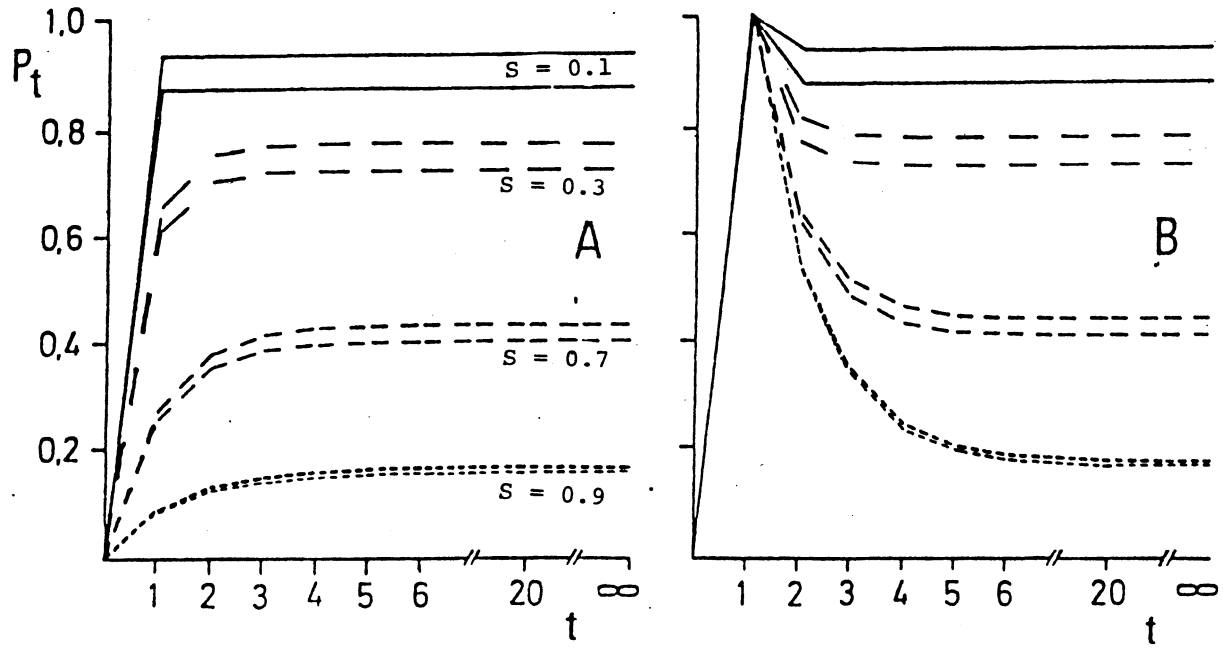

Figure 3: Index of panmixis (P_t), as a measure of the degree of heterozygosity, in relation to the propagation generation (t) of synthetic varieties with varying proportion of self-pollination (s) (according to Geiger 1982). To found the synthetic (syn-0 generation), seeds of the parental lines were mechanically mixed (A) or crossed with each other by hand (B). The top curve of each pair applies to n = 16 and the bottom curve to n = 8 parents per variety.

Biological Inventions and Swedish Patent Legislation

Tore Oredsson*

The following study, which is reproduced from the renowned Swedish periodical Nordiskt Immateriellt Rättsskydd (1985, No. 2/3, pp. 229-259) with the kind permission of the periodical and the author, examines questions that are of great interest in the context of the ongoing discussions on the impact of biotechnology, and, within that field of genetic engineering, on the protection of new varieties of plants. Although the study is based mainly on the Swedish patent legislation and practice, the arguments put forward are of such a general character that they promote reflection outside both Sweden and the patent field. That was the reason for publishing the study also in Plant Variety Protection. It goes without saying that the opinions expressed by the author do not necessarily correspond to the views of UPOV or its member States, in particular since some of the problems dealt with are outside of the terms of reference of UPOV.

The article has not remained uncontradicted, which is an indication of its importance. A first reaction was published in the same issue of NIR (pp. 299-300) and is reproduced on pages 62 and 63 below. Plant Variety Protection will also make its columns available to the more detailed reviews that have already been announced. The questions involved are of paramount importance to the development of plant variety protection and patent law, and a thorough discussion of all aspects involved will contribute to the working out of sound solutions.

Introduction and History

General

A patent may be defined as a privilege giving the patent owner the sole right to utilize an invention for a limited length of time. Society has an interest in the making of inventions, since they promote technical development. The possibility of obtaining a patent has been regarded as stimulating inventiveness. The inventor can count on financial reward for his effort, as a result of his exclusive right.

In exchange for the exclusive right, the inventor puts at the disposal of society new technical knowledge, which may be a platform for further technical development. More and more attention has been paid during recent years to the importance of the technical documentation formed by published patents and patent applications.

The view that the patent system promotes technical development is not uncontested, and it is also difficult to substantiate. In the western industrialized countries, the prevailing opinion would appear to be that a well-developed patent system favors technical development.[1] It has been alleged by some developing countries, however, that the patent system unilaterally favors large multinational companies and is a disadvantage to domestic industry.

The development of molecular biology and the technical and industrial utilization of it ("biotechnology") is an interesting area where arguments for and against the patent system can be studied. Is the system, which was originally intended for non-living material, also beneficial to, and appropriate for, inventions dealing with living material? Are there other and better methods of stimulating development of living material? What role has the system played in the enormous development of molecular biology and the biotechnology resulting from it? What degree of analysis, flexibility and foresight with regard to this development have the legislators shown and how much should they show? How do plant breeders, microbiologists, geneticists, virologists

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* Chairman, Chemical Division, Court of Patent Appeals, Stockholm. The views expressed in this article are those of the author and do not necessarily represent the view of the Court of Patent Appeals.

1 M. Jacobsson, E. Tersmeden, L. Törnroth, Patentlagstiftningen, 1980, pp. 2-3; K. Pfanner, Förderung der technischen Entwicklung und gewerblicher Rechtsschutz, GRUR Int. 1983, pp. 362-370; H. Brett, The Patent System - What Future Role in the Creation of Wealth? 5 EIPR 1983, pp. 83-85.

and other specialists affect the implementation of the tools that society regards as being necessary for stimulating development in this area? What are the ethical consequences of this development and the selection of tools for stimulating it? Will the large multinational companies control development? Will it be possible for the developing countries to take advantage of it for their provision of food and medicines? The chain of questions can be very long, and there is good reason to return to some of them.

History

The process of culturing microorganisms, such as bacteria, yeast and other simple fungi, for the purpose of obtaining some substance (metabolite) that they produce, or the entire microorganism itself, has ancient roots in food processing, e.g., in the manufacture of ale and wine, sour milk, yeast, etc.

These culturing processes could be protected by letters patent as early as in the 1884 Royal Ordinance on Patents, and its amendments up to January 1, 1945. Patents could not be allowed for the products obtained by the culturing process, however, since these were foodstuffs and patents were not allowed for foodstuffs until 1978. Patents have also been granted under the Ordinance for methods to increase or decrease the growth of plants and animals and for treating soil to inhibit or promote the growth of plants.

An interesting development in biotechnology began about 40 years ago. This was the utilization of the ability of usually previously unknown microorganisms to produce new substances on culturing, such as antibiotics and enzymes, as well as to convert substances, e.g., steroids.

The problems in patent legislation which this development caused were discussed in an article in NIR 1958.[2] The Swedish patent legislation provided for the requirement of reproducibility, and this was a burning question in the discussions carried on at that time with respect to possible patent protection in the area of plant breeding. In the article a section from "State support for plant breeding, etc."[3] is quoted:

> "From the aspect of patent law, reproducibility means that the teaching provided by the described invention should be capable of being applied repeatedly with exactly the same result. Such reproducibility practiced with a new plant variety produced by plant breeding implies that, on following the directions given in the description of the patent, the breeding process which resulted in the creation of the plant could be repeated, there being the certainty of obtaining further specimens biologically identical to the original specimen."

In this definition it has been assumed according to the article that for a new variety of plant the "invention" consists of the way in which the plant has been created. Since such a creation cannot be reproduced with guidance from the information that can be given in the description of a patent (if it is reproducible at all), then it cannot be said that there is an invention in the usual sense. The fact that plant breeding methods in the form of crossings can be said to be theoretically reproducible and that it is merely a question of statistics to decide how often on average crossings must be repeated between the male and female of the plant in question (the number of necessary crossings can be counted by the thousand) to obtain precisely the combination of properties characterizing the new plant does not, according to the article, alter this assessment.[4] The probability of a plant breeding method based on

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2 T. Oredsson, Some Problems in the Handling of Patent Applications Where the Action of Microorganisms is Utilized, NIR 1958, pp. 66-79. The article is further discussed by J. Tak, Bijblad Bij De Industriële Eigendom 28 (1960), No. 11, pp. 139-154; L.J. Robbins in XLII JPOS 1960, pp. 830-848 and in GRUR Int. 1961, pp. 117 et seq.; H. Wirtz, Der Patentschutz biochemischer Verfahren (thesis), Munich, 1967; B. Godenhielm, NIR 1969, pp. 1-17; J. Rudolph, Wissenschaftliche Zeitschrift der Humboldt-Universität zu Berlin, XIX (1970), pp. 83-94; etc.

3 Statens Offentliga Utredningar (SOU) 1956:4, p. 54.

4 A. Hüni and V. Buss, Patent Protection in the Field of Genetic Engineering, Industrial Property 1982, pp. 356 et seq., particularly p. 366.

artificial mutation being reproduced is perhaps less than one in a million. With a new plant variety, if the "invention" is instead said to consist of the new variety as such, it can be asserted that the requirement of reproducibility has been met as soon as the plant can be propagated with retained properties. According to the article, however, reproduction in the biological sense cannot be considered as a reproduction of the invention without misusing the language customary in patent law. The conclusion was that it must be left to the legislators to provide legal protection for new plants by special legislation if such was necessary.

One of the primary questions in the article was the requirement of reproducibility in the culturing processes for microorganisms in the production of antibiotics and enzymes and the conversion of steroids.

Insofar as such a process required accessibility to new microorganisms, etc., as "starting material," "reaction components," etc., in order to be carried out, it should be clear--according to the article--how these new microorganisms, etc., could be obtained. For example, the statement that the microorganism Streptomyces crystallinus has been isolated and identified from "soil from a place in Brooklyn, New York" (Swedish patent 157 185), could naturally not be regarded as sufficient. At the same time, the article pointed out the difficulties for the applicant for a patent as well as the patenting authority with regard to identifying and classifying microorganisms, and thus deciding whether a particular strain is new or not. Third parties also had similar problems in deciding whether the utilization of a particular strain constituted infringement of a granted patent.

It was suggested in the article, with reference to American practice, that the description should contain as complete a taxonomical description of the strain as possible and as complete information as possible on where and how the strain had been isolated and that it had been deposited at some acceptable institution. Not until this had been done would it be possible to patent, as up to now, such culturing processes of microorganisms under the prevailing patent legislation. The need for some special legislation, possibly in conjunction with a statute protecting new plant varieties, would not arise.

The problems brought to the fore by the article were taken up by a working party of representatives from the Nordic Patent Offices, who proposed guidelines in 1960 for dealing with patent applications in this area. Amongst other things it was declared that it is suitable and desirable that the organism be deposited with an internationally known institution, either domestic or foreign and independent of the inventor (applicant), if the description cannot be drawn up so that confusion with other organisms is excluded, or that the organism is so rare that it can be assumed to be difficult to find it in nature, or that its production is not infallibly reproducible. The working party requested at the same time in a letter to the Nordic Committee, responsible at that time for a continuing report on questions concerning Nordic patents, that the Committee deal with the question of an obligatory requirement for the deposit of microorganisms. The working party was uncertain whether such a requirement could be introduced into the legal practice without amending the text in the law and providing a statement of justification. The Nordic Patent Offices accepted the proposed guidelines in 1962.

There was, however, no provision as to patent protection for inventions in this area in the proposal for new Nordic patent legislation worked out by the Nordic Patent Committees (Nordisk utredningsserie NU 1963:6), and the question of such protection was not touched on in the report in spite of the said letter. In working out the proposals to the Nordic countries' patent laws, the Act of 1967, a provision was included on the model of that discussed in the Council of Europe Convention. However, no detailed reasons were given for the provision. This is surprising when considering the exhaustive discussions on the question at the 1959 meeting of the Officials of Nordic Patent Offices.[5] Neither was there any initiative taken for an international discussion of questions in this direction.

In Article 2 of the Convention on the Unification of Certain Points of Substantive Law on Patents for Invention, the so-called Law Convention, adopted by the Council of Europe on November 27, 1963, the option was given to Member

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5 B. Godenhielm, NIR 1969, pp. 2-3.

States of not granting patents for plant varieties or animal breeds or essentially biological processes for the production of plants or animals, although patents could be granted for microbiological processes and the products resulting from such processes. According to Article 12, the Member States can also choose, for a limited time, not to grant patents for "agricultural or horticultural processes," other than those specified in Article 2. There is no further explanation or comments to the exception in Article 2 (cf. NU 1963:6, p. 104). The Convention was approved by the Swedish Parliament in 1967.

There was thus included in Section 1 of the 1967 Patents Act,[6] following the example of the Law Convention, a provision on the prohibition[7] of patents for plant varieties or animal breeds as well as essentially biological processes for producing plants and animals. That provision does not create an impediment, however, to granting patents for microbiological processes and products of such processes (corresponding provisions can be found in the European Patent Convention, Article 53).[8] In the history of the preparatory work on the Law, no explanation is given to the latter exception, as mentioned. In the Report NU 1963:6, pp. 97-98, it is pointed out that patents have been granted for the production of antibiotics with the aid of bacteria and fungi. It has also been possible to patent inventions having the object of promoting the growth of animals and plants or increasing the fertility of animals or plants. On the other hand, a process for producing a new plant cannot be patented due to the requirement of reproducibility.[9] According to the Report the new plant may possibly be reproducible in a biological sense, but the invented process is not reproducible within the meaning of patent law. Patents for such a method can therefore not be granted. The Report also refers to an investigation started in 1962 concerning protection for plant breeding products and associated questions.

There is also now a special civil law form of protection for new plants, the right to a plant variety. This form of protection is regulated in the Plant Breeders' Rights Act (1971:392) and the Decree (1971:393). A person who produces a new plant variety can by registration obtain certain exclusive rights for the commercial utilization of the variety. The Swedish legislation on plant breeders' rights is based on the 1961 International Convention for the Protection of New Varieties of Plants, which was revised in 1972 and again in 1978 with respect, inter alia, to the novelty condition.

The basic conditions for protection according to the Plant Breeders' Rights Act are that the plant variety be clearly distinguishable by at least one important characterizing feature from every other variety that is already known, and that the variety in question be homogeneous and stable after reproduction. Methods which substantially aim at altering the hereditary material of a plant do not enjoy any civil law protection under the Act.

Significant amendments to Swedish patent legislation were made in 1978, due to the progress which took place internationally. A Convention on the Grant of European patents, the European Patent Convention (EPC), was finalized in Munich in 1973. Sweden decided to become party to the Convention in 1977. At the same time, Sweden decided to ratify the 1963 Convention on the Unification of Certain Points of Substantive Law on Patents for Invention,[10] which was approved by the Swedish Parliament in 1967. Some amendments to the patent legislation then in force were required for Sweden to ratify the EPC. These amendments were approved by Parliament in 1977. The new Act, the Act on Amendments to the Patents Act (1967:837),[11] came into force on June 1, 1978.

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6 For the text of the Patents Act, see Industrial Property Laws and Treaties, SWEDEN - Text 2-001.

7 According to Section 1 of the Patents Act, "Patents shall not be granted for (1) inventions the use of which would be contrary to morality or public order..."

8 R. Schulte, Patentgesetz 1981, p. 40.

9 T. Hesser and E. Essén, Patentlagen 1968, p. 19.

10 Prop. 1977/78:1 Part A, p. 527.

11 SFS 1978:149.

According to the EPC, the description of an invention relating to a microbiological process or a product of such a process which includes the use of a microorganism that is not generally available is not considered as being sufficiently clear, unless a culture of that organism is deposited at an institution approved by the European Patent Office.

This obligatory requirement for depositing microbiological cultures for such inventions was introduced as Section 8 in the 1978 Patents Act. In other words, it took 20 years before the proposal in the article in NIR 1958, i.e., that a new microorganism used in a culturing process should be deposited, was put into the legislation.

According to the EPC, a deposited culture is in principle available to a third party when the documents of the case are generally available, although there are certain conditions for making the deposited culture available to a third party. A person desiring to avail himself of the culture must make a written request to the depositary institution and also make certain written commitments to the applicant for a patent or to its owner (Rule 28). To ensure as far as possible that a third party can actually utilize his right of access to deposited cultures, it is prescribed that an applicant who, in accordance with Rule 28 in the EPC Implementing Regulations, has deposited a culture of a microorganism and has provided certain information shall be regarded as having unconditionally and irrevocably permitted the deposited culture to be kept available for anyone in accordance with the provisions of Rule 28. The rule that a deposited culture must already be available when the patent application is made available to the public was introduced in spite of heavy resistance from the European chemical industry.

In Government Bill 1977/78:1, Part A, it was pointed out that in such cases the deposited culture must be regarded as an important part of the patent application, and that such a culture should be kept available to the same extent as other parts of the application. According to the Bill there could be no question of making exceptions, in cases where the microorganism has been put into custody, to the basic principle in Swedish patent legislation that the patent application must be made public at the latest 18 months after the filing date or the date of priority, where appropriate. The regulation introduced in the EPC concerning the accessibility of deposited cultures was also introduced into the 1978 legislation (Patents Act, Section 22, 6th paragraph, and Patents Decree, Section 17). From the following it will be apparent that after about four years there was willingness to tamper with this basic principle. It is also worth noting that in the Bill, the 1978 patent legislation and the rules of practice adopted in the same year by the Patent Office, nothing was mentioned about the developments which had taken place in molecular biology (hybrid DNA technique, hybridom technique, etc.) and which now will be dealt with briefly.

It was in 1953 that James Watson and Francis Crick discovered what DNA (deoxyribonucleic acid, the genetic material of the cell) looked like. It took about a decade before the researchers managed to develop methods for what is generally known as "deciphering the genetic code." It was then possible to clarify how the order of the DNA building blocks could be translated to the order of the building blocks in a protein. During the 1960s it was discovered how the genetic information in bacteria and viruses (procaryotes) is organized. Many proteins, and also a substance by the name of ribonucleic acid (RNA), take part in the process of decoding the information stored in DNA in genes.

Methods were developed in the 1970s making it possible to obtain an insight into the fundamental differences between the genetic material of procaryotes and the eucaryotes. In 1970 researchers found that the RNA molecule, which functions as a kind of messenger of the genetic information in an animal cell, has a particular appearance at one end, known as poly A. With its aid the messenger RNA (mRNA) may be extracted from a mixture of nucleic acids.

It was also discovered in the same year that certain cancer viruses have an enzyme which can make DNA with RNA as a template. This enzyme is called a reverse transcriptase. It is called reverse because it "reads," i.e., translates, from RNA to DNA. Reverse transcriptase became an excellent tool for making DNA copies of the messenger RNA. These copies are called complementary DNA (cDNA). The possibility of producing cDNA is decisive for the production of large amounts of DNA with the same genetic information as a given RNA.

Further knowledge was also obtained about the enzymes that can cut DNA into sections of different length, the so-called restriction enzymes, as well as the enzymes that can link pieces of DNA, the so-called ligases. The hybrid DNA technique became a reality in about 1973.

A method was achieved in 1977 of rapidly determining the order of the base units in DNA. The application of this method and the hybrid DNA technique resulted in an altered view of how genetic information is arranged in animal and plant cells.

The gene was previously regarded as a section of DNA, where the order of different DNA building blocks spelled out the order of the amino acids included in a given protein. In an eucaryotic cell the information does not lie in a sequence in the genetic material but is spread out. Sections of DNA which have nothing at all to do with the structure of the protein lie between the different segments of information. When a protein is to be formed, these information-carrying DNA segments must be put together, and the way that this is done is called RNA splicing.

The so-called hybridom technique was discovered in 1975, which permitted the production of large amounts of antibodies against almost any protein.

What has been said above is only a short sketch of the fascinating progress, which began in the 1950s and has continued up to the present time, in research into the molecular biology of bacteria cells aimed at discovering the biology of animal and plant cells at the molecular level so as to obtain clarity in the basis for the interaction of the cell with its environment.

With regard to developments in molecular biology, particularly the hybrid DNA technique, European industry requested a limitation of the cases in which a deposit is required according to Rule 28 in the Implementing Regulations to the EPC. As a result of this request from industry, the EPO Administrative Council decided, in December 1979, that a deposit was no longer obligatory merely because the organism was not generally available. A deposit is necessary only if the organism is either generally not available or cannot be described sufficiently clearly in the patent application. Another essential amendment to Rule 28 brought about by the demands of European industry concerns new provisions for the method of giving a third party access to a deposited culture. According to those provisions, the applicant for a patent can ensure, by notification to the European Patent Office, that a sample will not be supplied directly to third parties during a certain period. Instead, third parties are required to commission a specially appointed expert, who is given a sample for examination, the so-called "expert solution."

In Government Bill 1982/83:67, corresponding amendments to the Swedish patent legislation were proposed. Those amendments to the Patents Act (Sections 8a and 22) were adopted by the Swedish Parliament on April 20, 1983, and came into force on October 1 of that year.

Also in 1983, Parliament decided that Sweden would ratify the Budapest Treaty on the International Recognition of the Deposit of Microorganisms for the Purposes of Patent Procedure (Budapest Treaty) which was finalized in 1977 and entered into force in 1980. According to the Budapest Treaty, the deposit of a microorganism with an international depositary authority as provided for in the Treaty must be recognized by each Contracting State that allows or requires the deposit of microorganisms in conjunction with patents. In certain cases a new deposit may be made as a replacement for one previously made. That possibility applies, inter alia, if the deposited organism is no longer capable of surviving or if samples of the deposited organism cannot be sent abroad due to import or export restrictions. Such a new deposit must have in principle the same effect in law as if it had been made on the day when the original deposit took place. The right to renew a deposit in certain cases has also been introduced into the 1983 Act (Patents Act, Section 8a, cf., Patents Decree, Section 17c).

Other modifications in the Swedish patent legislation were also adopted.[12] When the Patent Policy Committee Report (SOU 1981:21), entitled International Patent Cooperation III (which resulted in Bill 1982/83:67), was

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12 M. Jacobsson, The 1983 Amendments to the Swedish Patent Legislation, NIR 1983, pp. 368-388.

circulated to the bodies concerned,[13] the necessity was emphasized of more closely investigating the question of civil law protection and its suitable implementation for gene technical processes and for new microorganisms that could result from those processes. In this respect the question of protection for the microorganism itself must be assessed in its entirety, irrespective of how it had been obtained. Certain concepts such as "microorganism" must also be clarified.

In Bill 1982/83:67 it was stated that inventors in "the microbiological field" had had difficulties in utilizing the patent system (p. 21). The patent legislation is not designed with this species of invention in mind. There are special problems when living matter is included as a part of the documentation (p. 22). The requirement of a clear description has been difficult to meet for "certain microbiological inventions."

For his own part, the Minister of Justice (p. 22) had some sympathy for doubts as to whether a patent was the suitable form of protection for all inventions in the "microbiological field." However, against the background of the conditions in the majority of large industrial countries, he was of the opinion that it was probably not possible within the near future to hold an international discussion on other forms of protection for inventions within the "microbiological field," and Sweden should therefore "also in the future ... use the patent as a form of protection for all inventions within the microbiological field." A prerequisite for granting a patent was that those inventions meet the general conditions for patentability that apply to all technical fields.

With regard to the question of what is to be considered a microorganism (p. 23), the Minister was of the opinion that it must be a matter for legal practice to decide in individual cases how the boundaries of this concept were to be set.

According to the Patents Act, a patent may be granted for a microbiological process and the products of such a process. The decisive question in granting patents for microorganisms as such was, according to the Minister, the interpretation of the words "products of such a process," and that legal practice should decide in individual cases whether a microorganism as such could be considered a product of a microbiological process and otherwise meet the patentability requirements applying to all inventions.

As a result of certain motions,[14] the Standing Committee on Legislation[15] emphasized that the reason for plant breeding having been given a special form of protection was that in the Nordic countries it had not been considered that the patent rules should be applied in the case of living matter (p. 6). The Committee subscribed to the opinion of the Minister that the Patents Act was not designed with a view to inventions in "the microbiological field" (p. 6). The Committee also pointed out that practice so far in Sweden was that a patent was not granted for an invention relating to a microorganism itself as such, i.e., a product patent on the microorganism.

The Committee was also of the same opinion as the Minister that a patent is perhaps not the most suitable form of protection for "all microbiological inventions" but referred, as did the Minister, to international conditions. The conclusion of the Committee was that for the time being there was no reason to contemplate other means for protecting "microbiological inventions" (p. 7).[16] The Committee referred to the Committee on Genetic Ethics (S 1983:03) because of a motion in which an investigation was requested on the need for civil law protection for genetic technical inventions in the biological field, as well as the suitable implementation of such protection.[17] According to the Standing Committee, this Committee would take up questions relating to intellectual property rights bearing on the fields in question.

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13 The Court of Patent Appeals, statement of January 15, 1982, pp. 2-6.

14 Motions 1981/82:719 and 1982/83:227.

15 LU 1982/83:33.

16 Rapid records of parliamentary debates, 1982/83, No. 124, p. 81.

17 Motion 1982/83:1763.

With regard to the questions as to what shall be regarded as a micro-organism and whether patents should be granted for microorganisms, the Standing Committee subscribed to the opinion of the Minister that those questions should be a matter for legal practice.

Parliament rejected all the motions.

The Patent Law Concepts:

"Plant Varieties or Animal Breeds," "Essentially Biological Process for Producing Plants or Animals," "Microbiological Process," "Product of Such a Process" and "Microorganism"

The reason why plant breeding has been given a special form of protection is that in the Nordic countries it was not considered appropriate to apply patent law to questions of living matter.[18] Judging from an OECD inquiry,[19] the same opinion prevailed outside the Nordic countries as well, to wit:

> "Patent laws date back to a time when the term 'invention' could be related only to inanimate matter, never to living organisms, with the exception of new plant varieties, which could already be protected in the past."

Without doubt it was this basic view which was behind the framing of the Law Convention and Section 1 of the 1967 Patents Act.

Biology, the science concerned with living matter, included both botany and zoology, i.e., both plants and animals. At the time of the development of the law, microorganisms, i.e., plants and animals only visible through a microscope, were categorized as plants and animals.[20]

The provision in Section 1 that a patent may not be granted for plant varieties or animal breeds was thus also intended to mean that patents could not be granted for microorganisms. At least until 1983 neither the Swedish Patent Office nor any other Nordic Patent Office ever granted a patent for a microorganism.

It has already been pointed out in the Introduction that processes for culturing microorganisms with the object of producing foodstuffs have been capable of being protected by patents for many years. About 40 years ago the ability of usually previously unknown microorganisms, on culturing, to produce new metabolites as antibiotics and enzymes as well as to convert substances, e.g., steroids,[21] began to be utilized. After it became known that microorganisms could be cultured to produce new metabolites, patents were granted in Sweden for such culturing processes for the production of antibiotics, and up to 1958 about 15 had been granted.

It thus appeared natural that in drawing up the Law Convention as well as Section 1 of the 1967 Patents Act, no reason was found to alter the possibility established in practice of patenting culturing processes of this kind as well as the resulting products. The special provisions for prohibition of patents for foodstuffs and pharmaceuticals in force at that time were disregarded in this connection.

The provision in Section 1 that patents may be granted for microbiological processes and products of such processes therefore has a natural explanation, and the concepts used have a natural significance and limitation. A microbio-

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18 LU 1982/83:33, p. 6.

19 OECD, DSTI/SPR/82, 10, Biotechnology and Government Policies: Patent Protection in Biotechnology; dist.: February 26, 1982.

20 Kirk and Othmer, Encyclopedia of Chemical Technology, vol. 9 (1952), pp. 85 et seq.; Ullmanns Encyklopädie der technischen Chemie, vol. 12 (1960), pp. 430 et seq.

21 T. Oredsson, Some Problems in the Handling of Patent Applications Where the Action of a Microorganism is Utilized, NIR 1958, pp. 66-79.

logical process within the meaning of the Patents Act is a use of a microorganism, substantially in the form of culturing it, and the product of such a process is the new metabolite formed on cultivation.

What is then intended by the provision prohibiting the grant of a patent for "an essentially biological process for the production of plants or animals?" According to comments on the Swedish patent legislation,[22] a process is biological if it aims at altering the hereditary material of animals or plants. It must be assumed that the term "hereditary material" was intended to mean the substance DNA which transfers the hereditary properties from generation to generation. The comments mentioned selection and crossing as examples of purely biological processes.

Interference to a certain extent in the genetic material of higher organisms such as plants and animals[23] can already take place now, inter alia, through the following processes:

(a) transferring genetic information via hybrid DNA technique;

(b) production of somatic cell hybrids;

(c) production of mosaic individuals;

(d) injecting genes into a given cell nucleus by micro-injection;

(e) inserting well-defined DNA (gene) in a living cell, so-called transfection.

Such processes must also be regarded as purely biological processes. They are indeed popularly called "gene technical" processes (as with "hybrid-DNA-technique" and "hybridom technique"), thus giving rise to the thought that human technology is used to an essential extent for engaging in the process. But with regard to their nature the processes must be considered as being close to crossing and selection.[24]

It must be regarded as impossible to grant patents for such processes.[25] By way of summary it may be said that every transfer of genetic material to higher organisms such as plants and animals, whether this material comes from such organisms or from "microorganisms," and independent of what method is used in that transfer, must be considered as a substantially biological process for the production of plants or animals, for which patents should not be granted.[26]

Any other assessment would be contradictory to the International Convention for the Protection of New Varieties of Plants (Article 2), of which Sweden is a party, according to which it is not possible to obtain a patent for one and the same plant variety both via the Patents Act and the Plant Breeders' Rights Act. According to Section 3 of the Patents Act, a patent for a method of altering the hereditary material of a plant would mean indirect product protection for the new (altered) plant variety produced by the method, for which protection according to the Plant Breeders' Rights Act could be cited at the same time.

The opinion mentioned above is also supported by the fact that during the drawing up of the Plant Breeders' Rights Act, the methods which substantially aimed at altering the hereditary material of a plant were excluded from civil law protection. It was regarded as important that breeding methods be put at the general disposition as soon as possible. A high standard of plant breeding

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22 T. Hesser and E. Essén, Patentlagen 1968, p. 20; M. Jacobsson, E. Tersmeden, L. Törnroth, Patentlagstiftningen 1980, p. 59.

23 Prop 1982/83:1763; LU 1982/83:33, pp. 7-8.

24 Urs D. Blum, Selected Problems of Patent Protection for Microorganisms under the European Patent Convention and the Swiss Patents Act, Contemporary Industrial Property 1978, pp. 89 et seq.

25 E. Tersmeden, Justitiedepartementet, October 3, 1983, Dnr 1410-83.

26 N. Wallace, Practice Before the European Patent Office - Examination and Opposition, 2 EIPR 1983, p. 37. In this article the author is in favor of granting patents.

was dependent on open communication between theory and practice, a free interaction between research and practical breeding efforts. Against this background it would appear peculiar if, without amendment of the text in the Act and without any direction from the preparatory work, civil law protection in the form of patent protection could be introduced in this circuitous way for some form of process for altering the hereditary material which leads to a new (altered) plant variety.[27]

According to the comments to the patent legislation,[28] there are processes that have the object of affecting the properties of a plant but not its hereditary material. The comments indicate that such processes are not considered as essentially biological and therefore fall outside patent prohibition. It would appear that the normal direct connection between properties and hereditary material is disregarded here. Properties cannot be altered without altering the hereditary material. On the other hand, it is possible to affect the behavior of a plant. This depends on both hereditary factors as well as the environment. Alterations in the environment, e.g., treatment of the soil or hormone treatment of the plant, can be imagined as improving the growth of a plant and its ability to reproduce itself, even if the results are different, due to small differences in genetic construction in the same plant variety. If the hereditary material has not been affected, such a process for increasing the reproductive ability and growth of a plant variety would not be considered as a substantially biological process. Treatment of "reproduction" material, such as seeds, with a certain chemical substance for making the seed resistant to herbicides could be regarded in the same way, provided that the hereditary material was not affected. A patent could be granted on the method, although patent protection for the reproduction material treated with the given substance could hardly come into question, taking into account Section 1 of the Patents Act.[29] In this connection there can be problems in assessment and deciding boundaries.

Only the transfer of genetic material to higher organisms such as plants and animals has so far been touched on. As already mentioned, at the time of the Law Convention and the preparatory work for the 1967 Patents Act, microorganisms were clearly considered as being in the same category as plants and animals. The conclusion drawn above with regard to "gene technical" processes in conjunction with higher organisms would therefore also apply to lower organisms such as microorganisms. Every transfer of genetic material to such lower organisms, whether this material comes from higher organisms such as plants and animals or from other lower organisms, and independent of the way in which the transfer takes place, is to be regarded as an essentially biological process for the production of plants and animals in the form of microorganisms for which patents must not be granted.

It has recently been alleged that these "gene technical" processes are microbiological processes within the meaning of the EPC and the Patents Act.[30] According to the EPO's guidelines of April 1983, the concept "microbiological process" should thus not only include industrial processes in which microorganisms are used, but also processes for producing new microorganisms, e.g., by gene technical processes. It should be noted that the latter were not included in the guidelines of September 1979 or October 1981. In January 1984, the Swedish Patent Office also issued guidelines according to which the concept of "microbiological process" is to be interpreted, until further notice, as including not only methods utilizing microorganisms but also methods of producing new microorganisms, e.g., gene technical processes.

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27 J. Straus, Patentschutz für gentechnologische Pflanzenzüchtungen? Zum Verbot des 'Doppelschutzes' von Pflanzensorten, GRUR Int. 1983, pp. 591-597; R.S. Crespi, Biotechnology and Patents: Outstanding Issues, 5 EIPR 1983, pp. 203 and 204.

28 Supra, footnote 22.

29 R. Singer, Developments in the Case Law of the EPO Concerning European and Euro-PCT Patent Applications, Industrial Property 1983, pp. 387-401, particularly p. 396; Official Journal EPO 3/1983, pp. 112-117.

30 E. Tersmeden, Justitiedepartementet, October 2, 1983, Dnr 1410-83; PRV: Patentavdelningens cirkulär No. 14, January 18, 1984; Guidelines on Substantive Examination in the European Patent Office, Part C, Chapter IV, p. 27 (April 1983); cf., comments on the German Patents Act, R. Schulte, Patentgesetz 1981, pp. 40-51; N. Wallace, Practice Before the European Patent Office - Examination and Opposition, 5 EIPR, p. 37.

The concept of "microorganism" thus includes, at least according to the Swedish Patent Office Rules, non-differentiated plant and animal cells. The meaning of this concept will be dealt with later on.

It is, however, clear that at the time of the so-called Law Convention and the 1967 Patents Act, microbiological processes, with the exception of water purification and other similar processes using microorganisms, mainly comprised methods of culturing microorganisms with the aim of producing alcohols, organic acids, polysaccharides and antibiotics, steroid hormones, enzymes, etc. The possibility of achieving a new "microorganism" by altering the hereditary material, e.g., with the aid of hybrid DNA technique, hybridom technique or transfection technique, was not anticipated by the legislators.

With regard to this fact and to the general ban on patents for "essentially biological processes," the administrative instances' new interpretation of the texts of the European Patent Convention and the Patents Act appears to represent a substantial alteration of the material content of the texts, which was not intended at the inception of the Convention and the Act. Such amendment requires amendment of the legal text, or at least clear directions in the preparatory work to the Convention and Act. This kind of new interpretation also leads to difficult problems in drawing up boundaries and in terminology.[31]

With this new interpretation, is a hybrid DNA technical process carried out on plants or animals, such as the insertion of a nitrogen fixing gene in a plant (plant cell), a microbiological process or an essentially biological process for production of plants or animals? The answer to this terminological question is decisive in the determination of whether or not a patent may be granted.

What are the factors which should determine whether the hybrid DNA technical process is essentially biological or microbiological? Should the decision rest on whether the receptor is a plant or animal or a microorganism? Or should the question of where the genetic material comes from or the nature of the procedure which is carried out be of decisive importance? Or should the nature of both receptor and donor be taken into consideration?

Problems in the boundary area between lower and higher organisms can be further exemplified. A gene from an animal cell, responsible for the formation of a certain hormone, can be isolated and introduced into a bacterium. The gene is thus not of microbiological origin. For the sake of argument, the introduction of the gene into the bacterium may be assumed to be a microbiological process since the bacterium is a microorganism. Let us also assume that the hormone in question has improved activity if there are carbohydrate chains coupled to the molecule. This cannot be achieved in the bacterium, and it is therefore necessary to use microorganisms that are more developed, such as yeast cells, or cells from an animal. The use of yeast cells should then also be regarded as involving a microbiological process. But what is the situation if a tissue-cultured animal cell is used?

If questions of this kind are to be solved solely by legal practice, there will be uncertainty in practice, which will be disastrous to progress in this area for many years.

At the time of the enactment of the legislation relating to microbiological processes, the processes which were developed, and for which patents were sought within the framework of the legislation, were--as has already been stated--primarily related to culturing known, or new, microorganisms taken from nature for the production of new antibiotics, new enzymes or some other chemical substance. The antibiotic, enzyme or substance was the product of the microbiological process. It is also apparent from the comments to the Swedish Patents Act[32] that a microbiological process is such a culturing

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31 R.S. Crespi, Biotechnology and Patents: Outstanding Issues, 5 EIPR 1983, p. 203.; Urs D. Blum, Selected Problems of Patent Protection for Microorganisms under the European Patent Convention and the Swiss Patents Act, Contemporary Industrial Property 1978, p. 89 et seq.

32 T. Hesser and E. Essén, Patentlagen 1968, p. 20; M. Jacobsson, E. Tersmeden and L. Törnroth, Patentlagstiftningen 1980, pp. 59-60.

process within the meaning of the Act. New (changed) microorganisms can also be obtained nowadays with the aid of genetic processes. The culturing of such a new microorganism is of course to be regarded as a microbiological process.

The process of culturing microorganisms is in its nature specifically different from a process for altering the hereditary properties of a microorganism. Culturing a microorganism, e.g., a virus strain, can sometimes lead to a genetic alteration. However, the alteration may be undesirable, although it may also lead to the microorganism being given properties that are improved in one way or another. When a given virus strain is cultured, it cannot only be attenuated, but can also obtain an interferon inducing capacity. Such a culturing process must be regarded as a microbiological process within the meaning of the Act. The general rules of patentability, such as the reproducibility requirement, apply here.

According to the Government Bill and the Legislative Committee[33] it should be left to legal practice to decide whether a microorganism as such should be considered as the product of a microbiological process and otherwise meet the conditions of patentability applying to all inventions. However, the Bill emphasizes the desirability, and the Committee the urgency, of Swedish legal practice being developed with consideration as to how these questions are being answered in other countries and in the European Patent Office.

From what has already been said, it can be seen that patents may not be granted for living material such as plant varieties and animal breeds and that microorganisms were regarded as plants or animals when the 1967 Patents Act came into force. The Swedish Patent Office has also been negative, at least up until 1983, to granting a product patent for a microorganism as such, irrespective of how it has been obtained. It is further evident that in the Patents Acts of 1967 and 1978 a microbiological process mainly signifies culturing a microorganism. The product of the process constituted a product of metabolism (antibiotic, enzyme, etc.) thus obtained. The possibility of obtaining a definite new microorganism by changing its hereditary material was not known or even anticipated, in any case not in 1967.

Against this background it is surprising that the legislator puts these questions in the hands of adjudication. Patent protection for new microorganisms would obviously mean considerable changes in Swedish case law. If such changes are considered desirable, it should have been marked by alteration of the text in the Act or at least by clear directives in the Bill.

It must also be regarded as unusual and dubious to cite legal practices in other countries and the EPO, which have different legislative traditions and patent laws, in such an important question. It may be said quite generally that the international legal situation concerning protection for microorganisms as such has been, and still is, unclear.[34] In 1980 the U.S. Supreme Court, in a judgment drawing a lot of attention (with five votes to four), allowed a patent for a bacterium from the family Pseudomonas, containing at least two plasmids with the ability of degrading oil, and produced by a genetical engineering process (Diamond v. Chakrabarty). The principle extent of this judgment has caused lively discussion in the USA.[35] Another case, In re Bergy, was pending at the same time in the Supreme Court but was withdrawn.[36] This

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33 Prop 1982/83:67, p. 25; LU 1982/83:33, p. 7.

34 R. Teschemacher, Patentability of Microorganisms per se, 13 IIC 1982, pp. 27 et seq.; R.S. Crespi, Biotechnology and Patents: Outstanding Issues, 5 EIPR 1983, p. 202.

35 Impacts of Applied Genetics, Microorganisms, Plants and Animals, Office of Technology Assessment, Congress of the United States, April 1981, pp. 22-24; Patentability of Microorganisms: Issues and Questions (1981), a report from a symposium arranged by the American Society for Microbiology in cooperation with the Committee on Science and Technology, U.S. House of Representatives and the Congressional Clearinghouse on the Future; W.A. Biggart, Patentability in the United States of Microorganisms, Processes Utilizing Microorganisms, Products Produced by Microorganisms and Microorganism Mutational and Genetic Modification Techniques, 22 IDEA 1981:2, p. 217 (the US Patent Office rejects claims for microorganisms produced by more conventional methods, e.g. mutants produced by U.V. radiation or treatment with chemical substances causing mutation, than by genetic engineering); S.A. Bent, Patent Protection for DNA Molecules, 64 JPOS 1982, pp. 60-86.

36 Banbury Report 10, Patenting of Life Forms, 1982, pp. 69-71, 79-83 and 276-278.

case related to a biologically pure culture of a microorganism strain which had been found in an impure state in nature together with other strains of other organisms. The culture could produce the antibiotic "lincomycin." On two occasions the case had been decided by the Court of Customs and Patent Appeals (CCPA) in favor of the applicant. It was assumed that if the further problems on which the Supreme Court would have had to take a stand in In re Bergy were decided simultaneously with the Chakrabarty case, it would have reduced the probability of the Supreme Court maintaining the CCPA's decision in the Chakrabarty case. What was feared was that a decision, apart from taking a position on the question of patent protection for living material, would perhaps recommend that what is regarded as patentable according to 35 U.S.C. 101 would not be expanded in time with science and technology without explicit decision or consent by Congress. It was of the utmost importance that the probability of a negative decision by the Supreme Court in the Chakrabarty case be minimized. The decision to refrain from prosecuting the Bergy case was a strategic decision and was made after a large number of legal experts had been consulted.[37]

In the pertinent American literature it has also been pointed out that the judgment in the Chakrabarty case has a limited scope and cannot be cited in cases such as those dealing with patent protection for new microorganisms found in nature, or for plant or animal cells as such.[38] In the latter question, the philosophical and moral misgivings revealed in the Chakrabarty case, but left unsolved by the Supreme Court, will certainly recur.

To illustrate how these questions have been answered in other countries, it may also be mentioned that the Commissioner of the Canadian Patent Office, on the recommendation by a Patent Appeal Board, convened by the Commissioner, and obviously influenced by the U.S. Supreme Court judgment, approved a claim for product protection for a mixture of five different fungal organisms that the applicant had found utilizable for the biodegradation of sulphite liquor. In the Canadian decision[39] it was pointed out that the ruling is applicable to all "microorganisms," including cell lines for example. Some doubt prevails with regard to higher forms of life such as plants and animals. If an inventor creates a new and unobvious insect which can be reproduced and may be utilized, e.g., for killing spruce bud worm, this is obviously a patentable subject. Insofar as even higher forms of life can be created reproducibly, and the remaining conditions for patentability are met, then according to this decision there is no reason to treat those forms in any other way.

The EPO has granted a patent, inter alia valid for Sweden, for a "microorganism."[40] Such decisions to grant product patents for microorganisms, however, have not yet been reviewed either by any board of appeal or by any national court in any of the Member States.[41] It must therefore be said that no EPO practice has been developed (cf., what has been said above regarding the EPO's guidelines of April 1983 concerning "microbiological processes"). The statement in Government Bill 1982/83:67 and by the Legislative Committee that Swedish jurisprudence in this area should be developed in consideration of how corresponding questions are answered at the EPO is natural. Important as it is that Swedish jurisprudence develops in consideration of EPO practice, it is just as important that EPO jurisprudence takes into account practice in Sweden and the other member countries. There is a good foundation for asking how amendment proposals to the EPC Implementing Regulations and the development of practice in the EPO can be influenced so that the risk of the EPO controlling patent policy in Sweden in an unacceptable manner can be avoided. This applies particularly to amendment decisions which touch on the EPC's material

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37 Banbury Report 10, Patenting of Life Forms, 1982, pp. 276-278; Donald D. Daus, New Life in US Patents, The Chakrabarty Case, 3 EIPR 1981, p. 195.

38 John W. Behringer, Microorganism Patents, 63 JPOS 1981, pp. 128-137; J.F. Haley, Jr., United States Patenting of the Fruits of Biotechnology and Genetic Engineering.

39 4 EIPR 1983, pp. D-96-97; William L. Hayhurst, Canadian Patent Office Decision on the Patentability of Living Things, 80 Pat. & T.M. Rev. 1982, p. 406.

40 European publication Nos. 6694, 9930, 12,494, 13,830, 21,468 and 32,675.

41 R. Teschemacher, Die Patentfähigkeit von Mikroorganismen nach deutschem und europäischem Recht, GRUR Int. 1981, pp. 357 et seq.; 13 IIC 1982, pp. 27-41.

content and which are made by the EPO administratively without calling a Revision Conference according to Article 172.[42] With regard to Swedish domestic legislation, experience points to the risk that such decisions by the EPO are regarded as compelling corresponding amendment under the umbrella of harmonization.

As already mentioned, the important concept of "microorganism" has not been defined in conjunction with the creation of the 1967 and 1978 Patents Acts. The word "microorganism" is indeed not explicitly used in Section 1 of the Patents Act, but it is in Sections 8 and 22. The meaning of this concept has great importance in patent legislation, and there is thus good reason to deal with it here.

In Government Bill 1982/83:67 it is stated that "the meaning of the concept of microorganism in patent legislation does not necessarily need to agree with the meaning the concept is given in scientific circles."

Furthermore, there is reference in the Bill to the fact that during the preparatory work for the Budapest Treaty it was unanimous that the microorganism concept would be interpreted in its widest sense, taking into account the aim of the Treaty, and that all microorganisms which can be deposited with a depositary authority should be included. It should be noted that the Budapest Treaty does not contain any exemplification of what is to be considered as a microorganism (cf. Records of the Budapest Diplomatic Conference, WIPO, p. 119). The examples virus, plasmids and non-differentiated plant and animal cells (cell lines) in SOU 1981:21 have thus no counterpart in the Budapest Treaty.[43] In Bill 1982/83:67, which mentions viruses and plasmids, no exception is made to classifying "non-differentiated plant and animal cells (cell lines)" with microorganisms.[44]

However, the Budapest Treaty has the sole object that deposit, which has taken place at an international depositary authority in accordance with the provisions of the Treaty, shall be recognized by every Contracting State. The Treaty does not have the further ambition of defining any boundaries for how the microorganism concept shall be interpreted in patent law. This obvious situation is also apparent from an OECD Questionnaire.[45] The experts who put it together can be assumed to be well acquainted with the Budapest Treaty. Even so, judging from the Questionnaire, they do not share the opinion of the Patent Policy Committee, the Minister of Justice and the Legislative Committee with regard to how cell lines and plasmids should be classified. In the inquiry, cell lines are counted as living material of a kind other than microorganisms, and plasmids as non-living material, i.e., chemical substances. It must therefore be confusing to allege, as is done in the Bill and in the Report by the Legislative Committee, while citing the Budapest Treaty (see Government Bill 1982/83:67, p. 24, and Report LU 1982/83:33, p. 7), that a practical boundary has been made against both animal breeds and plant varieties, which may not be patented, and chemical compounds without life.

Judging by the difficulties occurring during the preparatory work on the Budapest Treaty in agreeing on a definition of the concept of "culture of microorganism" (cf. Section 8 of the Patents Act; this concept was replaced in the Budapest Treaty quite simply by "microorganism" on Swedish initiative), the statement on the meaning of the "microorganism" concept in the Budapest Treaty would, without doubt, have been given other wording if it had been understood in the preliminary work as intending to control or quite simply tie up the interpretation of the concept in every country.

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42 See, for example, K. Haertel and R. Singer, The First Three Years of the European Patent Granting Procedure, Industrial Property 1981, p. 336; E. Persson, NIR 1983, pp. 574-575; N. Wallace, Practice Before the European Patent Office - Examination and Opposition, 5 EIPR 1983, p. 37.

43 SOU 1981:21, Internationellt patentsamarbete III, p. 39 and Prop. 1982/83:67, p. 24.

44 Ibid.

45 OECD, DSTI/SPR/82, 10, Biotechnology and Government Policies: Patent Protection in Biotechnology; dist.: February 26, 1982; Banbury Report 10, Patenting of Life Forms, 1982, pp. 87-88 and 139.

A definition of the microorganism concept has, however, importance for delimiting microorganisms in respect of so-called higher life form organisms.

A limitation could first take place by drawing a distinction between single-celled and multi-celled organisms. This has obviously not been done. According to the Patent Office Rules of Practice,[46] the microorganism concept shall include "non-differentiated plant and animal cells (cell lines)" (cf. SOU 1981:21, p. 39).

The reason for this situation appears to be that it is also possible to isolate individual cells in cell cultures from multi-celled organisms and to cultivate those cells as if they were microorganisms. Such cells can also be conceived as utilizable for producing goods that are interesting from the medical aspect.

Coupling together "non-differentiated plant and animal cells" with "cell lines" does, however, give the impression that the question is one of entirely synonymous concepts, although this is not the case.

In this connection it is also strange that a difference appears to be made between a differentiated cell and a non-differentiated cell. Although it may be easier to culture and produce cell lines from non-differentiated plant and animal cells than from ones that are differentiated, there is no principle difference between these two types of cell, since they contain the same genetic material in the cell nucleus. The difference is that in a differentiated cell only selected parts of the hereditary material can be utilized. These parts are also different and depend on the tissue in which the cell is to be found. It is also possible to produce cell lines from liver cells and skin cells (fibroblast).

The deciding question is how a plant cell, for example, can be classed among microorganisms. The eminent experts who have put together the above-mentioned OECD Questionnaire have counted cell lines as living material of a kind other than microorganisms. Patent protection for a microorganism, obtained by a gene technical process, is indicated as one possibility.[47] Analogously it should be possible to obtain patent protection for a new (altered) plant cell produced by a "gene technical process." It is conceivable to operate on the genetic material in the cell nucleus of a single plant cell by some form of genetic engineering. An entirely new plant can be produced by culturing this cell. Patent protection for such a modified plant cell can hardly come into question, however, taking into account the restraint in the Patents Act against the protection of a new plant variety and the content of the Plant Breeders' Rights Act, as well as the 1961 International Convention for the Protection of New Varieties of Plants. Without amendment to the Patents Act it thus appears inconceivable to treat such plant cells as microorganisms. Animal cells must be regarded as equal to plant cells in this respect.

It is possibly even more difficult to draw a boundary between simple microorganisms (virus is included here, although there are different opinions on this in scientific circles[48]) and other self-replicating, genetically active material as well as between chemical compounds. In actual fact, the question is where the boundary lies between living and dead material. The ability of self-replication is usually given as a criterion of "living." How should a DNA molecule, a segment of such a molecule, a gene and an even smaller fragment of a DNA molecule be regarded? DNA is understood quite generally today by experts in molecular biology as an active, variable substance. Genes occur in segments which overlap each other and can change places in certain sections. They are so complex that it is difficult to say where they begin and where they end. The "gene" concept is actually difficult to define. Is it a requirement that the DNA molecule or a part of it be self-replicating and be able to produce a protein? How is a plasmid defined?

Can a gene be understood as a microorganism, provided that its reproduction can be induced either on the initiative of the gene itself or by a "specific microbiological process?"

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46 PRVFS 1983:3 P:12,2.

47 Patentavdelningens cirkulär No. 14, January 18, 1984.

48 B. Malmgren, Introduktion till mikrobiologin 1968, pp. 31-34.

Is there any difference, with regard to reproduction and other properties, between a gene taken from living material and a synthetically produced "gene" that justifies those genes being considered different? Should self-replicating so-called viroids (infectious substances) occurring in plants be classed with living material such as "microorganisms?" In the cells of these plants, viroids are capable of achieving their own reproduction but they are too small and too simple to be able to form a protein.

There is reason here to discuss the concept of "derived culture" used in the Patents Decree. According to the 1983 Patents Act, Section 22, 8th paragraph, a third party must give an undertaking in order to prevent misuse of a supplied sample. The content of this undertaking is provided for in Section 25a of the Patents Decree. The declaration must include not only the sample (the culture) as such but also any culture derived from it that has retained the characteristics of the deposited culture essential for working the invention. In the case where the proposed "expert solution" should be applied, the expert must provide a corresponding undertaking according to the Patents Act, Section 22, 8th paragraph, and Section 25b, 3rd paragraph, of the Patents Decree.

What is more exactly intended by "derived culture which has retained the characteristics essential for working the invention" is not clear and definite from the preparatory work.[49] The most favorable interpretation of this concept, seen from the point of view of the patent applicant, would be that it includes the case where the important genetic material, e.g., in the form of a gene, introduced into the known microorganism, e.g., an E. coli, to form a certain protein (the patent claim is assumed to disclose the E. coli in which the necessary gene for forming the protein is included), is taken away from the known microorganism and introduced into another known microorganism completely separate from the first one, the latter being, for example, a yeast fungus, which is thus given the ability to produce the same protein. In other words, a derived culture could be any microorganism containing the gene in question, or even any microorganism containing all the different DNA sequences, coding for one and the same desired protein. Such an interpretation of the concept of "derived culture" must appear foreign to an expert (microbiologist), however, and will furthermore lead to "protection" for the applicant (patent owner) far exceeding what can be regarded as reasonable in the case in question. The legislator ought also to have misgivings about such an interpretation.

The problems in conjunction with the interpretation of the concept "derived culture" will probably lead to an applicant for a patent seeking protection solely for the important genetic material, e.g., in the form of a gene, which will form a certain protein.[50] The question of whether genetic material such as a gene should be regarded as a microorganism or not is therefore extremely pressing and should be solved expeditiously.

Although microbiology is under rapid development and there is considerable risk of statements quickly becoming out of date (see Government Bill 1982/83: 67, p. 24), it nevertheless appears necessary that a group of experts with an international composition, if possible, in plant breeding, microbiology, molecular genetics, virology and patent law be given the task of proposing (pragmatic) solutions to the boundary problems in respect of so-called higher life form organisms as well as the boundary between microorganisms and genetically active material.

There is reason to emphasize that possible patent protection for "microorganisms" in the form of plasmids and other genetic material, as well as for DNA fragments in the form of organic chemical compounds, can have considerable consequences for a plant breeder who desires to exploit a plant variety protected by the Plant Breeders' Rights Act, and containing such genetic material

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49 Patentbesvärsrättens remissyttrande, 1982-01-15 över betänkandet, SOU 1981:21, pp. 23-26; Sidney B. Williams, Jr., Schutzrechtliche Aspekte der Gentechnologie bei Pflanzensorten, GRUR Int. 1983, p. 712, footnote 75.

50 H.D. Boeters and W. Lindenmaier, Schutz von Zellkulturen entgegen der Bäckerhefe-Entscheidung - für Erfinder schon nicht mehr aktuell?, GRUR 1982, No. 12, p. 703 et seq.; A. Hüni and V. Buss, Patent Protection in the Field of Genetic Engineering, Industrial Property 1982, pp. 356 et seq.; S.A. Bent, Patent Protection for DNA Molecules, 64 JPOS 1982, p. 62.

or DNA fragments protected by a patent.[51] The legislator has not dealt with these consequences.

The Importance of the Description in the Specification in Conjunction with Biological Inventions

As can be seen from what has already been said, the possibilities of granting patent protection to biological inventions within the framework of valid patent legislation are limited.

It can be questioned whether patent protection is the most suitable form of civil law protection for the recent research results in microbiology, molecular genetics, plant and animal breeding and virology. An unbiased investigation as to the suitability and implementation of civil law protection for biological inventions therefore appears to be urgent. The problems of terminology and delimitation mentioned here should, in particular, be studied.

Pending such an investigation it can be considered justified, starting from valid patent legislation, to deal with some other prerequisites for obtaining patent protection that have not been touched on earlier as well as with certain other questions and problems that need to be taken into account in conjunction with patent protection for biological inventions.

In this section the general requirement in the Patents Act for a clear description of an invention will be discussed.

The description is the basis for an assessment of patentability, particularly the assessment that is made concerning the question of the reproducibility of the invention. It is also through the description that the invention becomes known to the general public after publication and after the documents have been made available. This awareness is necessary not only for the effectiveness of the opposition process but is also a primary aim behind the patent system as such. The special difficulties that occur in providing a sufficiently clear description with regard to inventions in the biological area have led to a statutory requirement (1978 Patents Act, Section 8) that microorganisms that are to be used in working an invention and that are not generally available should be deposited in a special way. In the 1983 Patents Act, Section 8a, the deposit may now also be avoided in cases where a microorganism not generally available can be described in the text of the application documents with such clarity that the invention can be worked with their guidance.

The intention of the deposit process is not that it will replace a description of the microorganism or of how the latter has been obtained. The applicant is thus presumed to give as complete information as possible as to the morphological, physiological and biochemical properties of the organism, supplemented by serological and chemical investigations, etc. Numerical taxonomy and different molecular genetical methods, such as examination of the base composition of DNA or the relationship (homology) in the DNA sequence, can be used for defining the biological similarity or relationship between different microorganisms. Unfortunately, there are no international rules for how microorganisms should be described in patent applications, which makes more difficult the comparison, necessary for the assessment of patentability, between a microorganism used in accordance with the invention and previously known ones. In spite of the progress which has been made in the classification of microorganisms, it is still the case that with few exceptions a microorganism can only be described approximately.

The possibilities are generally the same for describing how a novel microorganism found in nature may be isolated again in nature, and how a novel microorganism produced artificially, e.g., with the aid of genetic methods, can be produced once again in the same way. It is thus only in exceptional cases that the description can be made so clear that it will provide the necessary guidance to enable one skilled in the art to produce the microorganism and work the invention.

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51 Plant Breeders' Rights and Patent Rights in Relation to Plant Genetic Engineering, Nationale Raad voor Landbouwkundig Onderzoek 1984, No. lo/83/W291.

The opinion has been put forward that in inventions relating to a novel microorganism found in nature or produced in some way, it would be sufficient to deposit the microorganism. A description of the microorganism and how it has been obtained should thus not be necessary. As far as Swedish patent legislation is concerned, such an opinion must be regarded as contrary to the provisions of Sections 8 and 8a of the Patents Act and Section 17 of the Patents Decree, which state how the description of an invention should be constituted.

It is important that the provisions on the clarity of the description be fully observed. It is primarily the responsibility of the patenting authority to see that such is the case.

As was noted in the introductory section, a new deposit can be made under certain conditions as a replacement for one made previously, and from which samples no longer can be obtained. In this connection a clear description is naturally necessary in conjunction with a renewed deposit. The deposit which is to replace a previous one must relate to a microorganism of the same kind. Deficient identity in this respect can result in either rejection of a patent application in the process of prosecution or invalidity of a patent already granted. If a clear description of the microorganism is not made in the patent application, the chances are small, if not to say infinitesimal, for the opposer, or somebody else who lacks access to the previous deposit, successfully to allege in the individual case that the identity is deficient. The requirement of a clear description must therefore be maintained for this reason as well, and should be applicable irrespective of the fact that a microorganism is self-replicating. The claim that nobody would ever bother to attempt to reproduce the production of the microorganism with guidance from the description, since the microorganism can be more easily obtained by requesting a sample of the deposit, does not alter this assessment either.

Living organisms, particularly microorganisms, are often used as starting material in gene technical processes. These organisms may be described in the literature. It is the responsibility of the applicant to decide whether these organisms can be regarded as generally available in this way. If not, the (micro)organisms should be described and possibly deposited so that the provision of clarity in the Act can be regarded as having been met.

The predominant theme above has been that the Patents Act has a requirement for clarity with regard to the description of an invention, and that it is primarily the responsibility of the patent authority to see that the requirement is met. At the same time, it is quite clear that in this technically very complicated area there can quite often arise great difficulties for patenting authorities and the courts in making up their minds as to whether the description meets the requirement of clarity within the meaning of the Act. Difficulties also fall on opposers and others who have cause to concern themselves with the description. There is thus reason to point out that without the availability of samples from a deposited organism, unreasonable time and cost must often be incurred by a person who wishes to use the invention as a basis for further research and development. It may therefore be questioned whether the invention in such cases has been made known from the description.

This situation is worthy of attention, against the background of the statement in Government Bill 1982/1983:67 and Report LU 1982/1983:33 that there is an essential difference between one competitor obtaining access to the traditional written description giving directions for a technical solution and another competitor obtaining a sample from a deposit, through which the means of production itself will be available to the latter. If a competitor with guidance from such a description can within a reasonable time and at a reasonable cost really produce, and unambiguously identify, the organism, which according to Government Bill 1982/83:67 is decisive for meeting the requirement that the description must be clear,[52] he has control over the means of production, irrespective of what research work and what costs the applicant for a patent has incurred. Since deposit is not required, the competitor does not need to suffer the disadvantages involved in the "expert solution" system. In actual fact, the competitor has a more favorable position

52 Prop 1982/83:67, p. 40, item 5.7, and p. 68, paragraphs 6-7.

than if the "traditional written description" did not exist, making it necessary for him to request a sample from a deposit. The statement by the legislator that there is an essential difference thus only has significance if it is assumed that the traditional description is of such a nature that the competitor cannot produce and unambiguously identify the microorganism within a reasonable time and at a reasonable cost. In turn this would mean that a description, which can only be utilized by contributing an unreasonable amount of time and cost for once again producing and identifying the organism, measures up to the yardstick according to Sections 8 and 8a of the Patents Act. The different statements of the legislator appear irreconcilable.

The Subject of Patent Law in the "Biological" Field

The following overview is based on the 1983 Patents Act.

The relationship between the drafting of a claim, the protection the claim gives and the experimental support in the description has been discussed in different connections. The problem has also been touched upon[53] in conjunction with patent applications relating to the use of microorganisms, e.g., for the production of antibiotics by culturing. It can be quite generally established that these questions come even more to the fore in dealing with patent applications including gene technical processes. The Swedish Patent Office has provided guidelines in the Rules of Practice for dealing with patent applications in this area.

(a) A Novel Metabolite

A new metabolism product (metabolite), obtained by culturing a microorganism, can be protected by a patent, provided that the product meets the general conditions for patentability applicable to products within other technical fields. This includes, inter alia, a clear characterization of the metabolite, e.g., an antibiotic or an enzyme. It is outside the framework of this summary to discuss further when a novel metabolite should be regarded as having been clearly defined.

Culturing the microorganism must also be described in such a way that a third party can repeat the process and thus obtain the metabolite in question. If the microorganism is novel and is neither generally available nor can be described in the application documents in such a manner that one skilled in the art can obtain the microorganism and work the invention, the microorganism must be deposited. This applies irrespective of whether the microorganism has been obtained from nature or by a gene technical process, such as by hybrid DNA technique. If a gene technical step is included, the above rules also apply for the "microorganisms" required in the gene technical step. The concept "microorganism" thus includes different forms of DNA-containing material, cf., below. For example, this can apply to the microorganism which, with the aid of restriction enzymes, can be split into DNA segments such as a plasmid intended for use as a vector in the gene technical step and the plasmid in question.

It is important to emphasize that deposit cannot replace a description of the novel microorganism and how it has been obtained. Even if the Patents Act requirement of clarity is not met by the description, a description must nevertheless be provided. Merely a description of how the culturing of the microorganism is to be carried out and a deposit of the new microorganism are not sufficient.

The metabolite has so far been assumed to be capable of definition to the required degree with the aid of different parameters. If the structure of the metabolite is not known and it is otherwise not possible to describe it clearly, claims for the metabolite may be related to the method in which it is produced ("product by process claim"). In this connection, it should be mentioned that the protection for a product characterized by the method in which it has been produced must be regarded as applicable only for a product produced in this way (cf., "indirect production protection"). No general

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53 T. Oredsson, Some Problems in the Handling of Patent Applications Where the Action of a Microorganism is Utilized, NIR 1958, pp. 66-79.

protection for the product can be obtained by a "product by process claim." It has been proposed that instead of "produced by" the expression "producible by" should be used. The latter would indeed not tie protection of the product to the special process. A claim on a product solely characterized by it being producible in a given way cannot be accepted, however. Such a product claim must be regarded as indeterminate. If the claim contains parameters, which in themselves define the product to the required degree, it does not need to be disclosed in the claim how the product has been produced.

(b) Culturing Method

The method of culturing a microorganism with the aim of producing a new or known metabolite can be protected by a patent, provided that the process meets the general patentability conditions applicable for processes within other technical fields.

If the process relates to the production of a new metabolite, the considerations mentioned above apply to the microorganism used.

The question arises as to how the "microorganism" used can be defined. Is it necessary to state that a special strain must be used? Or can protection be obtained for a given, or every, microorganism containing the DNA material as coding for the metabolite in question? In the latter case a description is required of how microorganisms containing such DNA material can be produced. The extent of the protection requested depends on the extent to which deposit of strains takes place.

A special gene or DNA sequence can code for a given protein. A number of DNA sequences may possibly code for one and the same protein due to degeneration. Production of the protein can be obtained independently of the bacterium or yeast fungus in which the gene or DNA sequence is placed. The gene or DNA sequence can be made to contain further information by genetic modification, which improves the production of the protein, before the gene or the DNA sequence is introduced into some arbitrary bacterium or yeast fungus. Operations of this kind create problems in the formulation of claims, and may possibly have been the reason for the provisions, inserted in the 1983 Patents Act and Decree, that the undertaking which has to be made by a third party or expert, in conjunction with the request for a sample of a deposited culture, must apply not only to the deposited microorganism but also to cultures derived therefrom. The difficulties in formulating claims that give the necessary protection can lead to the genetic material, gene, DNA sequence or its modification being recited to a greater extent in the claims.

This is, however, not without risk. If the protein is known as to its structure and construction of amino acids, a structure of the genetic material which codes for this protein must also be regarded as known. This possibly also applies to all the different DNA sequences that code for this protein. Protection for this genetic material can then hardly be granted.

Added to this risk is that protection for the genetic material presupposes evidence as to its susceptibility of industrial application, its technical nature, technical effect and reproducibility, e.g., working examples showing how a microorganism is produced containing the genetic material and the other information required so that the genetic material introduced into the microorganism will code for the intended protein, and how the protein for which the genetic material codes is produced by culturing this microorganism. There may then be problems concerning the reproducibility of the participating steps.

The genetic material, gene or DNA sequence may have functions other than coding for a given protein. It may constitute different kinds of signals ("regulation signals," "recognition and binding sequences," "promotors," "transposons," etc.). Knowledge of the structure of the signal elements and how this structure affects the function is limited. It may be assumed that the question of whether the genetic material can be utilized industrially would in such a case be even more complicated and require convincing evidence in the form of working examples. Finally, it might be argued that the genetic material may be considered to lack technical character, and thus comes outside the invention concept in the same way as the examples enumerated in Section 1 of the Patents Act.

It may otherwise be questioned whether an invention in this area can be expressed in patent claims at all, solely by the genetic material which codes for the intended protein. In actual fact, to be patentable within the meaning of the Patents Act, an invention should contain a combination of special controlling elements, structural sequences and vectors for cloning, which give a maximum yield of the desired protein when the vector is replicated in a given host cell.

One approach that will probably be tried is to formulate claims relating to a specific genetic material or different combinations of signal elements, structural sequences and/or vectors in a more general, functionally oriented manner, e.g., in the form of DNA sequences or fragments with a certain specified function with respect to the information content of the parts. It remains to be seen whether such claims fulfill the requirements for clearness laid down by the Act and whether they will be accepted.

Research in this area consists to a certain extent of trying to find and reproduce the life-synthesizing machinery of the cell. DNA sequences are taken from one living organism to another. The question of whether these DNA sequences shall be regarded as natural products that are known per se and therefore unpatentable must be penetrated.

If the process relates to the production of a known metabolite by culturing a microorganism that has been produced by a genetic process and with an unknown DNA structure, the points of view mentioned above are valid with regard to the microorganism used.

The culturing (passages) of a microorganism, particularly a virus, on special media such as tissue cultures is used to alternate the virus. The microorganism can sometimes be given new and improved properties in this way. Irrespective of whether these properties depend on successive refining of a variant, which from the beginning has been included as a proportionally inconsiderable component in the initial strain, whether a new mutant has been caught up during the process or whether some other unexpected possibility has occurred, the method of culturing the microorganism is considered to be a microbiological process within the meaning of the Act. It should therefore be able to be protected by a patent, provided that the process meets the general patentability criteria. In this case the examination must include the possibility of reproducibility, particularly if the new or improved property depends on a genetic alteration of the microorganism, and whether the microorganism is clearly defined.

(c) Methods of Producing a New Microorganism

Patent protection should be possible for methods of isolating and producing a new, pure microorganism that has been found in nature if the patentability criteria applicable to all inventions are maintained. For example, the microorganism must be clearly recited in conformity with the Act. Furthermore, the method must be reproducible.

(d) Forms of DNA-Containing Material Other Than Those Coming Under the Concept of "Microorganism"

As far as a known or novel DNA sequence with a stated construction of nucleotid sequences is a dead material, it must be considered as an ordinary organic chemical compound. From the patentability aspect it should then also be treated as an organic chemical compound with a known or novel structure and follow the criteria and rules applying to such.

With regard to the method of producing these DNA sequences, the patentability examination should follow the guidelines applicable to examining methods of producing organic chemical compounds. If the method requires as starting material a "microorganism" that is new and neither generally available nor describable in the application documents so that one skilled in the art can work the invention with their guidance, then what has been said above applies to this starting material.

(e) Other Conceivable Forms of Patentable Subject Within the Biological Area

DNA is isolated from a donor organism or is produced artificially. It is treated with so-called restriction enzymes which split the DNA molecule into a number of DNA segments. A DNA segment, which has been obtained in such a way

by "cutting" the donor's DNA, is put together in a test tube with a plasmid or virus DNA which is treated with the same restriction enzyme. Another enzyme, a so-called ligase, is used to join the two DNA segments together. The united product is a hybrid DNA molecule.

Enzymes of this kind and other aids in the form of organic chemical compounds can be patented in conformity with the rules applying to organic chemical compounds.

(f) Other Conceivable Subjects in the Biological Field

"Microorganisms," DNA molecule fragments, enzymes, monoclonal antibodies, etc., may in turn be used in new fields, e.g., diagnosis, protein purification, the production of "biosensors" and "biochips." It would stray too far from the discussion here to say anything about developments in this area and their relationship to patent law.

The technical and industrial utilization of biological inventions requires methods and apparatus for processing, purification, control, etc. These aspects of biotechnology are also outside the scope of this article.

Special Considerations When Dealing with Patent Applications in the "Biological" Field

(a) Selection of Deposited Microorganisms

As previously mentioned, the 1983 Patents Act (SFS 1983:433) prescribes the deposit of a microorganism in certain cases. The deposit requirement is assumed to ensure that the invention is reproducible. The deposited microorganism must thus have all the properties that enable the invention to be worked with the aid of samples of the deposit. It is assumed that the applicant will deposit the best microorganism available when the application is filed. The possibility of reproducing the invention with the aid of a deposited microorganism should affect the question of patent validity.

(b) Stability of the Deposited Microorganism

The deposit must be made according to the Budapest Treaty (cf., Section 17a of the Patents Decree). This means that the microorganism must be stored with all the care necessary for keeping it alive and uncontaminated for a period of at least five years after someone has requested a sample of the deposit, and in any case at least 30 years after making the deposit.

The possibility of storing a microorganism for this period without it changing in any way has been questioned. If the "microorganism" concept may include, as stipulated in the Patent Office Rules of Practice, plasmids and non-differentiated plant and animal cells, the uncertainty of the durability of the deposit would seem to increase (the stability of deposited plasmids and cells produced by hybridom technique is uncertain). There has been no exhaustive discussion of this question and how it affects the validity of a patent. Different kinds of changes in the microorganism can be imagined which do not necessarily mean an interruption in its availability, but nevertheless signify an obvious encroachment on the interests of a third party.

On the other hand, in Government Bill 1982/83:67 and in the relevant statement by the Law Council and report by the Minister of Justice, the legal effect of a declaration of invalidity due to deficiencies in deposits was discussed, cf., (c), below. The Council was of the opinion--differing with the Minister--that if a deficiency in deposits occurs later and is not corrected, a patent owner should not reasonably be prevented from obtaining damages for injuries already suffered. The Minister maintained, however, that it is not unjust to the patent owner if he is cut off from the possibilities of prosecuting for patent infringement after he has let the deficiencies become so considerable that the patent could be declared invalid. No one should be convicted of patent infringement, whether it is a question of punishment or damages, after the patent has been declared invalid.

(c) The Right of Replacing a Deposit

A provision has been introduced into the 1983 Act, following the example in the Budapest Treaty, concerning the right to replace a deposit with a new one if samples from the previous deposit can no longer be supplied.

When a new deposit has been made, the question arises as to whether it really consists of the same organism as the previous one. If this is not the case, the content of the patent application or patent can be changed considerably by the new deposit. Controversy as to the identity of the microorganism can occur in a patent application case, for example, during the opposition procedure or during litigation on the validity or scope of a granted patent. The question of how the weight of the evidence should be handled is discussed in Bill 1982/83:67.

The questions of evidence are very complicated. The applicant's written assurance that the new culture consists of the same organism as the previous one is difficult to attack. Any possibility for an opposer, with guidance from a description but without access to the previous deposit, of discovering and demonstrating the opposite would appear to be available only in exceptional cases. Conditions will be different if the opposing party or infringer has access to the earlier deposit.

The question is also complicated since there are no uniform rules for how a microorganism should be described in a patent application (cf., Section 17 of the Patents Decree). A step towards ensuring that the new culture consists of the same organism as the previous one would be to require, apart from formulating certain rules for how a "microorganism" in patent applications should be described with the aid of methods now available, that the applicant's written undertaking also include some form of objective evidence of identity, based on numerical taxonomy and different molecular genetical methods, e.g., an examination of the base composition of DNA or relationship in the DNA sequence.

The opinion is sometimes aired that, in certain cases with inventions relating to the use of a new microorganism, it should be sufficient to deposit the microorganism and that no description of it and how it has been obtained should be necessary. In such cases the question of evidence and the burden of providing it will be even more complicated.

(d) The Expert Solution

Following the example in the EPC, provision has been made in the 1983 Act that, if the patent applicant so desires, samples of a deposited microorganism may only be issued to an independent expert, until the patent application has been laid open to public inspection or has been finally decided on without having been laid open to public inspection (Patents Act, Section 22).

This provision for the so-called "expert solution" corresponds poorly with the provisions for publishing documents that are also found in the Act. With the exception of France, no other Contracting State has at present introduced this disputed paragraph into its national legislation. The expert solution is not regarded in the Federal Republic of Germany as being compatible with German patent law. There is the risk that the expert solution will prevent, instead of promote, continued research and development.[54]

(e) Undertaking for the Prevention of Misuse of an Issued Sample Also Applies to Cultures Derived from the Sample

The Patents Act, Section 22, requires a third party to give an undertaking for the prevention of misuse of an issued sample. The content of the undertaking is regulated in the Patents Decree, Sections 25a, 25b and 25c.

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[54] K. Haertel and R. Singer, The First Three Years of the European Patent Granting Procedure, Industrial Property 1981, p. 336; R. Schulte, Patentgesetz 1981, p. 50; Prop 1982/83:67, pp. 44-46, Motion 1982/83:227, LU 1982/83:33, pp. 10-12, and Snabbprotokoll fran riksdagsdebatterna 1982/83 No. 124, pp. 82 and 84.

The basic questions concerning the meaning and extent of the protection intended by the undertaking as well as its relationship and suitable adjustment to the area protected by patent law are not clear. The same applies to the provision that the undertaking should include "cultures derived from the sample which have retained those characteristics of the deposited culture which are essential to carrying out the invention."

Infringement Problems

With method patents a special presumption rule has been discussed concerning litigation for damages as a result of infringement, with the object of increasing the efficiency of the indirect product protection and to strengthen the patent owner's position. According to this rule the burden of proof would be reversed. The product in question would thus be regarded as produced according to the patented process until the opposite were proved. The need for such a rule has recently been discussed in Report SOU 1983:35 on "Patent Litigation and the Sanction System in Patent Law." It is still uncertain whether such a presumption rule will be introduced into Swedish patent law. Process patents relating to the use of microorganisms give rise to special difficulties in this connection.

A common question in conjunction with infringement appears to be whether a microorganism that is utilized by somebody else is the same as the one disclosed in the claims, or whether it is within a defined area of equivalence to the latter. Presenting convincing evidence in this question will be very difficult, not least if the microorganism is produced by hybrid DNA technique. With the present legislation the patent owner has the burden of proof. Even with the availability of a deposit of a patented microorganism, the identification of and comparison between different microorganisms afford considerable difficulties due to the way microorganisms are built up. In spite of the progress that has been made regarding the classification of microorganisms, it is still the case so far that with few exceptions a microorganism can only be described approximately.

If the microorganism disclosed in the claims is a DNA segment, the possibility obviously increases for clear description and establishment of possible infringement the shorter the DNA segment is.

When it is a question of determining whether there is equivalence between what is protected by a patent and what is possibly an infringement, the rule of thumb can be used that a patent is infringed if mainly the same thing is done in mainly the same way for achieving mainly the same result. This rule thus presupposes identity with regard to function, means and result.

In order to demonstrate that two DNA polymers are equivalent, since they function in substantially the same way, a complicated comparison is primarily required of the ways in which information found in each of the polymers is used *in vivo*.

This information is possibly not tied to definite base sequences. The same information can thus be obtained by two or more different base sequences due to degeneration of the code. An infringer can consequently replace certain code words ("codons") with others which correspond to the same amino acid. A likeness is thus avoided if the claim can, so to speak, be interpreted according to its wording. In applying the equivalence doctrine it must, of course, be assumed that there is infringement in such cases.

It is, however, possible to achieve two essentially different DNA polymers in which the difference does not depend on degeneration of the code. Short sections of the DNA polymer can be replaced or excluded. Despite the differences, both of the DNA polymers can give instructions for synthesizing functionally equivalent proteins. In certain cases a somewhat modified protein can be obtained. The modification does not need to signify that the protein does not function for the intended purpose. The burden of proving that there is (functional) equivalence rests with the patent owner.

Identification of sequences for control and signals of different kinds can be made more difficult by sequences in the infringer's DNA polymer, which, from the point of view of the patent owner, more or less have the character of "scrap" ("noise") and have been added to cover up the infringement.

Utilizable parts of genes (called exons) from higher organisms can be used in a DNA molecule recited in a patent claim. Infringement in such a patent can be made more difficult to prove by inserting introns (DNA segments) in the DNA molecule, which separate the exons from each other in the original gene and have an unknown function. Another way is to add DNA segments from some other source. Despite the insertion of these apparently useless introns or DNA segments, the DNA molecule obtained can be functionally equivalent.

Against this background it is easy to understand why the value of a patent in the field of gene technology has been questioned.

Conclusion

The reason why plant breeding has been given a special form of protection in the Nordic countries stems from the opinion that patent law should not be applied in the case of living matter. The Patents Act is not formulated with inventions in the "microbiological field" in mind. If patent law is to apply to such inventions, a large number of problems will occur requiring special solutions not compatible with the basic ideas in the patent system. Some of these problems have been touched on. University researchers in Sweden have also questioned whether it would not be preferable to have a special civil law form of protection for microorganisms along the lines of plant breeding legislation for new plant varieties.

In conjunction with the treatment in Parliament of Government Bill 1982/83:67 there were motions[55] for an investigation into the question of how protection for inventions in the "microbiological field" could be suitably drafted, and also the need for civil law protection for genetic inventions in the biological field as well as the suitable drafting of such protection. The motions also referred to the debate on questions of this kind which has been going on in other countries as well. Parliament decided in favor of the Legislative Committee's request that motions 1981/82:719 and 1982/83:227 be rejected. The Committee was of the opinion, together with the Minister of Justice, in Bill 1982/83:67 that it was probably not possible in the near future to hold an international discussion on forms of protection other than patents for inventions within "the microbiological field." The Committee recommended rejection of motion 1982/83:1763 with regard to the studies in progress in the Gene-Ethics Committee (S 1981:03). According to the Legislative Committee, different industrial property rights questions associated with the biological field would be taken up there, and Parliament therefore rejected this motion as well.

In Bill 1982/83:67 and Report LU 1982/83:33 it was not stated why it would not be possible to have an international discussion on forms of protection other than patents for inventions in the "microbiological field." There is reason to emphasize that the previously mentioned OECD Questionnaire was an attempt to map out legislation and practice in the member countries for just such inventions. WIPO and the EC Commission have also announced certain investigations concerning industrial property rights and biotechnology. In other words, now should be a suitable time to initiate such a discussion. It is important that it takes place before standpoints have become too rigid.

The new gene technology affecting "microorganisms," plants and animals developed in recent years is the result of intensive fundamental research carried out in universities and research institutions all over the world. Results have been possible very much due to the free exchange of information traditionally taking place between such institutions. Although the research results so far are epoch-making, continued progress will require further intensive research efforts. The same, if not stronger reasons, put forward for excluding methods mainly aimed at altering the hereditary material of a plant from civil law protection can also be used concerning these new gene technical methods. With the latter it is also important that they may be practiced in free interaction between researchers and other interested parties. A strong commercial interest has been observed the last two or three years for these new genetic methods. Hundreds of small "off-shoot" firms have grown up from the American universities, but many of them are now in the process of

55 Motions 1981/82:719, 1982/83:227 and 1982/83:1763.

being taken over by the large pharmaceutical, chemical and oil companies. Only a small number of independent, small, genetic engineering companies will survive. At the same time both Swedish and foreign researchers have experienced considerable deterioration during recent years with regard to the free exchange of information. The publication of research results is delayed, and the free exchange of organisms halted.

In 1975, Milstein and Köhler published their discovery that it is possible to fuse a cancer cell (myeloma cell) with an antibody-forming B lymphocyte and that the hybrid can manufacture, actually mass produce, monoclonal antibodies, i.e., antibodies of exactly the same kind. They never sought any civil law protection (patent) on their discovery (invention). As dedicated researchers they primarily wanted to give these news to colleagues all over the world, and never troubled themselves with securing any financial interests. Even so, they started an avalanche in commerce and medical research with the hybridom technique. This new technique gained momentum shortly after their unpretentious report was published in "Nature" on August 1, 1975. Patents for applications of this hybridom technique have been published in certain countries. But it is questionable whether they have the necessary inventive merit. Apart from this, it seems unsatisfactory that researchers, choosing first of all to inform their colleagues the world over about their discovery should go without financial compensation while other researchers and enterprises using apparently obvious applications of this discovery not only obtain monopolies but also considerable financial gain.

Will there also be changes in the conditions for basic research? Can the possibility for industry to finance research at universities and obtain exclusive rights for exploiting the results conceivably lead to control of the research? How will researchers be affected by these new possibilities of financial gain?

And what is the future for developing countries, where genetic engineering and biotechnology are perhaps their most outstanding hope for the supply of foodstuffs and pharmaceuticals? Will the disunity between industrial and developing countries in the implementation of the patent license system in the Paris Convention affect progress in biotechnology so that the latter do not obtain access to research results which are necessary for their continued existence?

Neither are the biotechnological enterprises satisfied with the present industrial property right protection for biological inventions. The patent system is alleged to have many deficiencies and minor value for this rapidly growing industry. There is the opinion that the typical three-year prosecution time for patent applications in patent offices limits the usefulness of patent protection in this area. The deposit requirement is more nearly an advantage for competitors.

The plant breeders are also looking uneasily at the development of the industrial property right protection for biological inventions. They are asking themselves what the conditions are for them to be able to manufacture, sell or use a plant variety protected by the Plant Breeders' Rights Act and containing genetic material possibly protected by patents.

It is therefore important to remember that the patent system is only one of many tools for stimulating research and development and for protecting an invention, and that this system came into being during a time when industry had a completely different structure from the one at present. The first international patent convention, the Paris Convention, was signed in 1883. There are already several different ways, with their respective advantages and disadvantages, for protecting research results in biotechnology apart from the patent system. Such results can be treated as trade secrets. They can also be put to disposition by a contract regulating the conditions under which the researcher disposes of his results. Such contracts do not prevent the researcher from seeking patents at the same time. Certain authors have suggested that DNA sequences should be protected by copyright in the same way as data programs.

Against the background of the deficiencies existing in industrial property rights in the biological field, there is good reason to attempt to find an internationally acceptable system for protecting biological inventions, as far as possible without the disadvantages inherent in the present system. WIPO could no doubt engage in such an attempt.

A first step would be to arrive at an international agreement on the registration and publication of research reports on the results of work in biological science. In the case of gene technology, for example, reports would be included, irrespective of whether they related to "microorganisms," plants, animals or humans. WIPO could be entrusted with registration and the issue of a publication on biotechnology. The agreement could stipulate that registration means that no one shall utilize the published results commercially without the knowledge and approval of the researcher. Such utilization could be regulated by a special contract between researcher and utilizer.

A scientific council with the greatest possible expertise, and with its members drawn from a representative number of countries, could be convened. The composition of the council would guarantee that no group formations take place. Amongst its other tasks the council could have that of formulating the requirements placed on research reports in order for them to be registered and published. The requirements should be at least as severe as those for getting an article published in an internationally recognized scientific journal. The council could lead the way in finding pragmatic solutions to terminological and delimiting problems of different kinds, such as those existing between different kinds of organisms. Should there be disputes with regard to the protection given by registration, interpretation of contracts, breach of contracts, etc., the council could appoint an arbitration board with members having the necessary technical, (biological) and legal competence. The council would draw up the working rules of the board. The council and board should be able to utilize scientific and non-commercial international institutions, such as the planned UN center for gene technology and biotechnology. The protection of the research results which the researcher obtains by this registration and publication could be made dependent on the development the publication initiates. If Milstein's and Köhler's 1975 discovery had been registered and published in this way they would have been able to have received benefit from the obvious commercial applications that were developed a short time afterwards.

There is reason to believe that risk capital, necessary for commercially exploiting these research results, would be available for disposition even with the implementation of industrial property right protection sketched here.

A second step could be to investigate whether, apart from the International Convention for the Protection of New Varieties of Plants, there is a need for similar conventions for the protection of animal breeding products, microorganisms and gene technical methods of producing different forms of organisms. There is thus the possibility of reviewing the question as to what protection it is desired to give methods of producing new plant varieties, independent of whether these utilize traditional techniques such as crossing or new gene technology.

A third step could be investigating the possibility of stipulating that registration and publication according to the first step above for a given time (the period of grace) does not constitute a (novelty) bar to possible protection for material in the research report, which can be protected according to one or other of the conventions which can be the result of step two.

Industrial property right protection in all its forms presupposes a measure of ethics, a sense of right and wrong, for it to function in the intended way. The ideas for a solution put forward here are no exception. They also require, of course, just as much feeling for right and wrong as the present patent system demands if a patent in the biological field is not to be valueless through misuse.

There are indeed warnings against splitting up industrial property right protection into a number of international agreements relating to particular questions such as new plant varieties, scientific discoveries and data programs. Such an attitude locked to the present patent system is, however, hazardous to the future of the system, which undoubtedly has a role to play. However, one should have a clear understanding that important reforms are difficult to carry out, due to the international infrastructure of the patent system. Reforms and improvements can best be achieved if the patent system is regarded as one of many tools for stimulating and protecting inventions.

Biotechnological Inventions and Swedish Patent Legislation

Comments from L. Börklund* and R. Walles**

In the preceding article by Mr. T. Oredsson several references to the Swedish Patent Office and Swedish patent practice are made. We feel there is a need to clarify some of the matters brought forward in the said article, and a detailed commentary will be published in a coming issue of Nordiskt Immateriellt Rättsskydd (NIR). Nevertheless, some brief observations could very well be given already at this moment.

As pointed out by Mr. Ordesson, the Swedish Patent Law contains a provision (in Section 1) originally to be found in the so-called Law Convention (of 1963), the substance of which is to make it possible to obtain patent protection for microbiological processes and the products resulting from such processes, while generally excluding patent protection for plant or animal varieties or essentially biological processes for the production of plants or animals.

No explanation is given for the abovementioned provision in the preparatory work on either the Law or the Convention. What is then to be understood by a microbiological process or a product resulting from such a process? Neither the Government nor the Parliament nor for that matter any Court have explicitly answered the said question.

By the time the Law Convention was being conceived, products from microbiological processes were essentially chemical compounds, for which in Europe product protection by patent was limited. Furthermore, processes for producing new organisms were not considered to be capable of being reproducible. In the light of this it is perhaps not so mysterious that no deep analysis into the implications of said provision in the Patent Law was made.

There is, however, a continuous evolution in society and the field of technology. It is the evident task of a Central Industrial Property Authority to follow closely the technical and industrial development and to see to it that industry and the public be served through a reasonable and just application of the Law.

This role of the Patent Office was confirmed in the Bill of 1983 (concerning inter alia the Budapest Treaty), in which the Government stated that the question of what shall be regarded as a microorganism and whether patents should be granted for microorganisms should be a matter for legal practice.

The Swedish Patent Office has considered that, since similar legislation is in force in several other countries--and the EPC has corresponding provisions--it has been reasonable to adapt current practice to what is done in those countries.

When well defined and regulated procedures for depositing microorganisms became available (through the Budapest Treaty or bilateral agreements), it was considered possible to make the deposit part of the disclosure and consequently to regard microorganisms as being reproducible in the sense of the Patent Law.

In some countries--also in Europe--only plant varieties which can be protected by the "Protection of New Plant Varieties (UPOV)" are not patentable. The object is to avoid double protection. In the past the important legal-theoretical argument for special protection of new varieties of plants was the lack of reproducible manufacturing processes (cf. J. Straus: "Patent Protection for New Varieties of Plants Produced by Genetic Engineering--Should "Double Protection" be Prohibited?", IIC, Vol. 15, No 4/1984, p. 426-442). However, with the development in genetic engineering the possibility of fulfillment of general patentability requirements has appeared. This has opened up new avenues for the discussion on "biotechnological inventions and industrial property" and on the international level (WIPO) exploratory work has already started in a group of experts, who met in a first session in November 1984 (the group will discuss also other related questions).

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* Head, Patent Department, Swedish Patent Office.

** Head of Division, Swedish Patent Office.

As regards what happened to Mr. Milstein and Mr. Köhler, it is obvious that it would have been easy for them to file a patent application just prior to publishing their findings. By so doing they would have enjoyed both protection of their industrial property and scientific fame. There are rumors that they were in fact given the advice that there was little hope of success from filing a patent application. This story just goes to show that good advice could be worth a lot, and that no conclusions with respect to biotechnological inventions can be drawn.

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BEIER (F.K.), CRESPI (R.S.), STRAUS J.

Biotechnology and Patent Protection - an International Review
OECD ed., Paris, 1985, 133pp., 23cm.

This study was undertaken as a follow-up to the OECD Report Biotechnology: International Trends and Perspectives. It was considered by the OECD Committee for Scientific and Technological Policy, which recommended in October 1984 that it be published on the understanding that it reflected the views of the authors and not those of governments of OECD member States.

The study is in three parts:

(i) General reflections on "patents in a time of rapid scientific and technical change," naturally centered on biotechnology issues, by F.K. Beier and J. Straus;

(ii) An analysis of answers to a questionnaire on patent protection in biotechnology that was distributed to the OECD member States in February 1982, by R.S. Crespi;

(iii) Conclusions and recommendations, which are those of the group of experts which discussed and approved the final report.

As was to be expected from the authors' great competence and experience in the patent field, the study contains many thought provoking ideas and describes in a thorough and knowledgeable manner the background and the present situation. It is indeed a very comprehensive review of the complex problems under discussion in many organizations, and it will certainly form a valuable and solid basis for further reflection.

The study of course contains developments on plant and animal breeding, and on the protection of the results of inventive activity in those fields. In this respect, it is regrettable that the factual basis of the study, the questionnaire undertaken by the OECD, was not (or was only at the very final stage) extended to the plant variety protection authorities and the plant breeding industry in most OECD member States. This explains some formal deficiencies such as the reference (on the basis of the Belgian reply), on page 69, to the Belgian Law on the Protection of New Plant Varieties as "legislation on New Plant Products" (in French: nouveaux produits végétaux). That the authors had to base their study on one-sided information is also shown by the overstatement on page 70 to the effect that interested circles in the Federal Republic Republic of Germany "called firmly for the accessibility of patent protection for plant species (sic), especially produced by gene technology, under both German and EPC law": there is every reason to believe that the "interested circles" did not include the plant breeding industry, which is at present--and will remain in the future--the main producer of the varieties used in agriculture at large.

Thus, inevitably, the authors were also not supplied with the necessary information on the basic political, economic, technical and scientific facts governing agriculture and the plant breeding (whether "conventional" or "gene technical") and seed industries. This in turn has strongly influenced the conclusions--and this is reflected in the statement that "the implications for agricultural policy in allowing patent protection require careful preliminary examination" (page 92). On the basis of that statement alone one could question the value of the main recommendation of the group of experts, that "governments seek solutions ... to give more effective protection to new plant varieties arising from genetic engineering methods. Whether this is to be achieved by patent protection or by plant variety rights, there is an evident need for stronger protection than is possible at present. It would be desirable to allow the innovator the choice of the type of protection most appropriate to secure a proper return on his investment provided he can comply with the requirements of the chosen system" (ibid.).

[The Editor]

CALENDAR

UPOV Meetings

1986

April 15	Consultative Committee
April 16 and 17	Administrative and Legal Committee
April 18	Ad hoc Working Group on Variety Denominations
May 21 to 23 Hanover (Federal Republic of Germany)	Technical Working Party on Automation and Computer Programs
May 27 to 29 Pontecagnano-Salerno (Italy)	Technical Working Party for Vegetables (Subgroup on May 26)
June 4 to 6 Dublin (Ireland)	Technical Working Party for Agricultural Crops (Subgroup on June 3)
July 16 to 18 Wageningen (Netherlands)	Technical Working Party for Ornamental Plants and Forest Trees (Subgroup on July 15)
September 17 to 19 Wädenswil (Switzerland)	Technical Working Party for Fruit Crops (Subgroup on September 15 and 16)
November 18 and 19	Administrative and Legal Committee
November 20 and 21	Technical Committee
December 1 Paris (France)	Consultative Committee
December 2 to 5 Paris (France)	Council

Symposia

1985

December 3 to 6 Braunschweig (Federal Republic of Germany)	Colloquium on 15 Years Collection and Utilisation of Plant Genetic Resources by the Institute of Crop Science and Plant Breeding FAL Braunschweig

1986

February 17 to 20 Lincoln (New Zealand)	Department of Scientific and Industrial Research (DISR) Plant Breeding Symposium

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The International Union for the Protection of New Varieties of Plants (UPOV)--an international organization established by the International Convention for the Protection of New Varieties of Plants--is the international forum for States interested in plant variety protection. Its main objective is to promote the protection of the interests of plant breeders--for their benefit and for the benefit of agriculture and thus also of the community at large--in accordance with uniform and clearly defined principles.

"Plant Variety Protection" is a UPOV publication that reports on national and international events in its field of competence and in related areas. It is published in English only--although some items are trilingual (English, French and German)--at irregular intervals, usually at a rate of four issues a year. Subscription orders may be placed with:

The International Union for the Protection of New Varieties of Plants
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(Telephone: (022) 999.111 - Telex: 22 376-OMPI)

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