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STANDARDIZATION OF DISEASE RESISTANCE TESTS

Document prepared by experts from the Netherlands

Standardisation of disease resistance tests.

A proposal to standardise disease tests world-wide through the standardisation of control material to be included in each test. The proposal is based on the results of an international system to identify *Bremia* isolates, introducing a centralized differential set, maintained by seed companies and freely available for *Bremia* research all over the world.

Introduction

In vegetable breeding, disease resistances are, in most crops, primary breeding goals. In many cases disease resistance is no simple black and white case of susceptible/resistant, but a resistance scale is found. For reasons of communication with clients, the liability risk etc. it is very important to be able to clearly establish the level of resistance in a variety.

In the Netherlands a joint project was launched between the seed industry and Naktuinbouw, the Netherlands Inspection Service for Horticulture, to standardise disease tests. The original idea was to design a very precise protocol. If this protocol was exactly followed, equivalent results were expected. In practice, the results varied by company. It became clear that the number of parameters in disease tests was too high to be able to standardise these tests. One of these parameters is the source and quality of the inoculum used.

In comparing protocols and results from companies in different countries, it became clear that the inoculum used, may be a source of divergence. A complicating factor here is that the exchange of inoculum over the world is not always possible or even an option.

IBEB

A comparable problem occurred when new races/isolates of *Bremia lactucae* were found and nobody seemed able to identify these clearly. In this case, and later in the comparable case of *Peronospora farinosa* f. *spinaciae*, an international cooperation was started resulting in the establishment of a differential set of varieties and lines. The maintenance of these varieties/lines was divided between the companies, the seedlots produced are stored at Naktuinbouw and SNES (France). From these seed lots sets of samples are distributed to seed companies and researchers to use in identifying newly discovered races/isolates of *Bremia*. These recipients then make their results available to IBEB (International *Bremia* Evaluation Board).

With this system the distribution of new races/isolates to testing centers is avoided and replaced by the harmless distribution of samples of the differential set.

Solution for disease resistance tests.

To standardise the disease resistance tests, it is proposed to introduce a system, developed from the above:

Starting point

- Vegetable breeding companies will be invited to participate actively in the system. The management will be placed under the responsibility of the FIS/ASSINSEL Resistance Coding Working Group.

The working group is expected to organise the following in close cooperation with the participating companies:

- Creation of a list of control varieties for each disease test. For each test a negative and positive control to be defined taking into account known differences in inocula. If a scale of resistance is expected, controls per tresholtstep will be defined.
- For each control variety at least one seed company to be asked to ensure the production of sufficient quantities of seed.
- Central storage of the seedlots of the controls, at least in Europe and the USA and possibly in Japan.

Further items to be discussed:

- Participating companies may request sets of controls for inclusion in their trials.
- Monitoring the system, introduction of new tresholts, new controls, publicity
- The costs of such a system will be limited assuming the production of the seeds is free of charge (as it replaces the present necessity for each company to produce controls for all its tests). The storage, handling, postage, quality (germination) control of the central storage facilities may be covered by a fee per batch.
- Naktuinbouw is available to facilitate such a system and to act as European central storage and distribution center.

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