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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

GENEVA

THIRD MEETING WITH INTERNATIONAL ORGANIZATIONS

Geneva, October 12 and 13, 1987

RECORD OF THE MEETING

compiled by the Office of the Union

1. The President of the Council, Mr. Schlosser (United States of America), opened the meeting and welcomed the participants, the list of which is given in Annex I, with the following words:

> "On behalf of the Council of UPOV, it is my pleasure to welcome you to Geneva and to this third meeting between the UPOV Council and the private international organizations concerned with plant breeders' rights and patents in the field of plant varieties and seeds. We have invited you here because we take your views very seriously. We are here to do more than discuss the Convention. We are here to decide how it might best be revised. Quite obviously this task requires intense cooperation between the private international organizations and the UPOV member States. The ideas we will discuss here will be promptly discussed in the Council meeting later this week and then in appropriate UPOV bodies which will make decisions about the revision of the Convention as fast as is practical."

2. Mr. Schlosser then invited the international organizations which so wished to make opening statements.

OPENING STATEMENTS

3. Dr. von Pechmann (International Association for the Protection of Industrial Property--AIPPI) expressed thanks for the invitation extended to AIPPI to attend the present meeting, and declared that he wished to abstain from making an opening statement.

4. Mr. Roberts (International Chamber of Commerce - ICC) said that ICC felt that it was timely to consider revision of the UPOV Convention. There was important work to be done and the ICC was looking forward to a general improvement in the protection to be provided by plant breeders' rights and a solution to the apparent conflict between patent rights and plant breeders' rights.

5. Mr. Clucas (International Association of Plant Breeders for the Protection of Plant Varieties - ASSINSEL) said that his organization was also looking for strengthening of plant breeders' rights and the opportunities for patenting, where appropriate. Mr. Clucas also wished to raise two points. Firstly, he asked whether it would be possible within UPOV to establish an agreed glossary of phrases, as it seemed that a number of expressions arising in the working documents had different meanings in different places. In the longer term there would be some merit in developing a glossary giving guidance in this new area. Secondly, Mr. Clucas questioned the reference to animals found in document IOM/III/2. ASSINSEL had no competence to speak on intellectual property in the field of animal breeding, but he felt that any discussion on the topic should require the presence of representatives of the industry concerned. It might also be appropriate for such a discussion to take place in a separate meeting.

6. Mr. Royon (International Community of Breeders of Asexually Reproduced Ornamental and Fruit-Tree Varieties--CIOPORA) was pleased to have been afforded the opportunity of making the views of CIOPORA known; they had not changed substantially since the 1978 Revision Conference.

PROPOSALS FOR THE REVISION OF THE CONVENTION

7. Mr. Schlosser introduced document IOM/III/3 (Proposals of International Non-Governmental Organizations for the Revision of the Convention).

Article 2 (Forms of Protection)

8.1 Opening the discussions on Article 2, Mr. Schlosser stated that paragraph (1) was a much discussed, complicated and controversial provision. It concerned the availability of protection in two forms in any of the member States. It acknowledged that a member State might provide protection in two forms, but it precluded the Government of that State from offering alternate protection for any particular genus or species, or the choice of protection to the breeder. It was up to the Government to make the choice for the breeder. This Article had been very widely criticized by the organizations. The basis of the criticisms was that breeders ought to have the maximum protection available and should be free to choose the system that provided that protection. There was a general sentiment in favor of the deletion of the prohibition against dual protection.

8.2 Mr. Schlosser further stated that there was also sentiment in favor of the deletion of paragraph (2) of the Article, which permitted the State to limit protection within a genus or species to varieties with a particular manner of reproduction or a certain end-use. He then invited the international organizations to present their views on whether or not alternate protection should be available.

9.1 Mr. Slocock (International Association of Horticultural Producers - AIPH) said that it was correct that, in numerical terms, document IOM/III/3 suggested that there was major support for a change in Article 2(1). However, attention had to be drawn to the fact that in the case of some organizations which had

submitted written comments, there was evidence of a divergence of view. For its part, AIPH was of the definite opinion that it would be inappropriate to change Article 2(1) in the direction suggested. Any review made of the views of the organizations should take into account AIPH's position which had been explained in previous documents.

9.2 Mr. Slocock further stated that the only argument advanced for an amendment of this Article was the wish to increase the privileges of the breeder by taking advantage of the maximum scope of one system or the other. AIPH recognized the need for improving the breeder's position. It was the responsibility of UPOV, however, to ensure that there was a proper balance of interests within the Convention, and there was therefore no necessity to explore the possibility of alternative protection. It ought not to be a question of a breeder having an option.

9.3 Mr. Slocock concluded by saying that he represented the interest of users in this debate, a very powerful interest that should be given due consideration.

10.1 Dr. von Pechmann (AIPPI) said that Article 2(1) had already been relaxed somewhat by the introduction of Article 37 in 1978, and was essentially to be looked upon as a relic from the inaugural era of the UPOV Convention. Article 37 amounted to an acknowledgement that there was no other way of extending UPOV, and especially no other way of winning over the United States of America to UPOV. The United States of America was after all the largest member State of UPOV, and therefore unquestionably an important State. Recently it had enacted provisions that were particularly advantageous for breeders and had indeed been accepted by local breeders. It was therefore understandable that breeders in other States should wish to reap the benefits that Article 2(1) had hitherto forbidden them, and also that the pressure for amendment of Article 2(1) should become steadily greater.

10.2 Mr. Slocock had indicated that he was expressing the opinions of users and consumers. First and foremost however, UPOV administered a system that was intended to afford protection to breeders; it was so to speak a system of services rendered that was financed by the breeders. Dr. von Pechmann considered therefore that the interests of breeders should be given special consideration. Those interests were also the interests of the public at large, as it too desired progress, which was only to be achieved by the grant of proper protection. That had long been widely recognized in the field of industrial property. AIPPI therefore maintained that the improvement of protection by the removal of the provision under discussion would be nothing if not advantageous --for the general public as well as for breeders.

11. Mr. Schlosser asked Dr. von Pechmann whether revision of the Convention to provide for stronger breeders' rights would remove the need for offering the choice of the form of protection to breeders.

12. Dr. von Pechmann replied that the answer depended very much on the amendment of other articles, especially Article 5.

13. Mr. Roberts (ICC) said that his organization wished to support very strongly the amendment of the Convention by abolition of the ban on double protection. There were many arguments which could be advanced for this. It was crucial to have real protection for inventors in the field of biotechnology, and it was necessary to remove the ban on double protection in order to eliminate confusion. The typical biotechnology invention in the plant field was a new plant characterized by the presence of new gene X which conferred some

desirable property and which could be imported from a completely different organism. Patents should be granted for that kind of invention, and in some countries they were already being granted. Once the gene was successfully introduced in a plant, there was several years' work before a commercially acceptable variety was created. When it was created, there was confusion as to whether or not it was protected by patent. If it was not protected, the question arose as to how remuneration could be obtained for the invention. Mr. Roberts concluded by asking whether there was any reason to continue with the ban on double protection when there were major countries which did not conform to this provision of the UPOV Convention.

14. Mr. Schlosser asked Mr. Roberts what he meant by double protection: should a breeder have the right to protection both under the plant breeders' rights law and the patent law if protection was available under both in a particular country, or should he have the choice? In other words, was it alternate or duplicate protection that was referred to?

15. Mr. Roberts (ICC) replied that he saw no objection to duplicate protection. He said that it was not clear, in the situation that he had described, whether the biotechnological inventor would get any protection. The ICC position was that both rights should be available and that the breeder should have the opportunity of choosing.

16. Mr. Schlosser said that the glossary asked for by Mr. Clucas should include terms like "duplicative protection" and "alternate protection."

17. Mr. Clucas (ASSINSEL) said that his organization had not made a written submission on possible amendments to the Convention. The relationship between the possible patenting of plant genetic components and the question of strengthening the Convention were such that it was very difficult to come to a clear, concise and unified view within ASSINSEL on this subject.

18. Mr. Winter (COMASSO) referred to the written statement by COMASSO and declared that the European federated breeders had exactly the same opinions regarding the question of the ban on "double protection" as those voiced within ASSINSEL. First however, in Mr. Winter's opinion, it should be asked whether Article 2(1) was to be construed as a ban on double protection at all. Clearly there were sound arguments for ruling that out. Just as certainly, however, there was also the possible interpretation that did make it a ban on double protection. Yet if this were not plausible, then the entire discussion was not a matter for UPOV at all, but one to be settled within the framework of the patent system. If the provision actually did introduce a ban on double protection, as was contended by a broad majority at the present meeting, then clearly the statement by COMASSO was not just ambivalent, but lent itself to several interpretations. According to some representatives of breeders, it should be possible to select the best possible protection; others maintained that future breeding results should be entitled to protection under both the patent system and the UPOV system; still others claimed that one could be perfectly content with just one possibility of protection under the UPOV Convention, subject to the rectification of present weaknesses, which meant in particular that the scope of protection and its content had to be enlarged considerably.

19.1 Mr. Royon (CIOPORA) referred to the written observations of CIOPORA and pointed out that his organization was seeking the deletion of paragraph (2) and the deletion or amendment of paragraph (1) of Article 2 of the Convention. The main arguments for the proposals were the fact that the United States of America, and seemingly also Japan, already offered the possibility of recourse

either to patent protection or to protection by plant variety protection certificates. Mr. Royon also pointed out that patents generally afforded a more satisfactory level of protection to the breeders represented by CIOPORA. Other arguments could be added, including the fact that the protection granted under the UPOV system applied only to a small number of species.

19.2 Mr. Royon reverted to two questions that had just been mentioned: with regard to double protection, namely the combination of or choice between two systems of protection (patent and plant breeders' rights), Mr. Royon considered that combination was of interest mainly to the protection of biotechnological research findings. With regard to traditional plant varieties, it was probable that only a choice between two systems would be of any advantage, which explained the interest in the removal of the obstacle represented by Article 2(1). With regard to the "improvement" of the present UPOV system, Mr. Royon acknowledged that, if the level of protection conferred by the UPOV system were improved to the point of being equivalent to that of the protection conferred by an industrial patent, the problem of choice, and therefore of the amendment of Article 2(1), would probably no longer arise, as Mr. Schlosser himself had indicated in his exchange with Dr. von Pechmann. Mr. Royon nevertheless thought that the deletion of Article 2 would make for greater flexibility and would make it easier to find a solution to the problem of the apparent conflict between two systems of protection.

20.1 Dr. von Pechmann (AIPPI) wished to comment briefly on one of the questions raised. The ban on double protection was indeed a ban on the provision of patent protection as well as plant variety protection for a particular botanical genus or species. If one were to interpret Article 2 narrowly, and therefore abide strictly by its wording, then, owing to the fact that the effect of variety protection was limited to propagating material, the Article too would be confined to propagating material. Consequently one could obtain patent protection as well as plant variety protection. Experience had shown, however, that such a narrow interpretation was not shared by patent offices. It was therefore right to seek a fundamental review of the Article, as divergent interpretations were possible.

20.2 In the Federal Republic of Germany patent protection was obtainable for new varieties of plants that were not yet included in the List of Species to which the Plant Variety Protection Law applies. Consequently, patents had already been granted for new varieties. The Patent Office had for instance, in a decision dated November 13, 1986, granted a patent for a tetraploid chamomile that was characterized by an increased level of the substance chamazulene. An interesting feature of the patent document was the formulation of the claims covering several patent categories, namely the tetraploid chamomile--in other words the variety, the plant itself--the propagating material, the process for the manufacture of such new varieties of chamomile--in other words the breeding process--the use of the chamomile and finally the chamomile drug. Such comprehensive protection was not of course provided by the plant variety protection system, but was available through patent protection. The breeder of the tetraploid chamomile was therefore in a substantially better position than a breeder working with species that were in the List of Species. And that precisely was what many breeders, who would also have liked to benefit from the same strong, by no means unjustified protection, looked upon as discrimination.

20.3 Dr. von Pechmann recalled that Mr. Schlosser came from a country in which parallel protection rights were granted under the national plant variety and patent protection laws as a result of the ex parte Hibberd decision. Indeed there were no serious problems in the United States of America. Dr. von Pechmann took the liberty of asking Mr. Schlosser whether experience

in his country did not speak against the introduction of the same regulatory system in other UPOV member States.

21. Mr. Schlosser said that, in the United States of America, it had not yet been clearly determined whether true double protection was available. He expressed concern about true double protection because it was quite possible that a breeder's right certificate would be owned by one person and the corresponding patent by another, and that someone committing a single act of infringement would be liable twice for the same act. As far as alternate protection was concerned, it was the policy of the United States of America to provide for this, taking advantage of Article 37, and Mr. Schlosser was not aware of any problems as a result.

22. Dr. von Pechmann (AIPPI) observed that de facto double protection was known in many States in the field of technical inventions, the protection deriving from patents on the one hand and from utility models on the other. When the titles were in the same hands, there was no problem. When they were in different hands, then the question of who the first applicant was became critical. Neither for that matter could cumulative protection rights be claimed in proceedings for infringement, as under the civil procedure codes of many States a decision had to be taken on what protection rights were to be invoked for the purposes of the action.

23. Mr. Besson (International Federation of the Seed Trade--FIS) pointed out that the cases that had been mentioned were extremely recent. However, plant breeding programs were relatively long-term affairs, so that the problems perhaps had not yet had time to arise.

24. Mr. Williams (AIPPI) said that, with respect to experience in the United States of America on the possibility of dual protection, he was not aware of any particular problem in the case where patent protection and another form of protection were overlapping. There were overlaps between copyright and trademarks and between copyright and design patents. Each of those rights was established by a different legislative scheme. In addition, the problem of having two separate owners of a particular intellectual property right was not unknown. In the general industrial patent area, it was quite possible--and, in fact, it did happen--that there was one owner of a "generic patent" and another owner of a "species or selection patent." The fact that one single incident infringed both those rights did not cause any particular problem in the United States of America, and the existence of dual protection should not create particular problems in other places.

25.1 Mr. Slocock (AIPH) said that he understood that deletion of Article 2(1) would permit dual protection. The present paragraph, in AIPH's view, provided for alternative protection. AIPH's view was that UPOV should not be seen as a breeders' organization responsive only to the requirements of breeders as they see them. Mr. Slocock said that UPOV's responsibilities were far wider and they extended to other considerations, including agricultural and horticultural considerations, and to farmers', growers' and even the public interest. Furthermore, although the Chairman, in his opening statement, had referred to a certain strength of feeling among professional organizations for the deletion of Article 2(1), it was clear from written and oral statements made that there was a good deal of discussion within those individual organizations about the merits of such a change, and much would depend on what had been called "a strengthening of the Convention." It was AIPH's view that some adjustments to the Convention would meet many of the points which breeders' organizations put forward and would make unnecessary the deletion of Article 2(1).

25.2 Finally, Mr. Slocock added that the argument had been advanced that dual protection was needed to ensure that an inventor of new genetic material could achieve a proper return for his efforts. AIPH believed that an accurate definition of the interface between gene and character would ensure that those active on both sides of it would obtain adequate remuneration. Double, dual or duplicate protection was not required to provide such adequate remuneration.

26. Mr. Winter (COMASSO) wished to enlarge upon Dr. von Pechmann's remarks, in which he had indicated that the so-called double protection by patent and utility model was not a problem and worked well in practice. Due account should nevertheless be taken of the fact that there was no really marked difference between patent and utility model protection, whereas the present discussion had to do with two fundamentally different systems. It could be said that the utility model was a sort of younger brother to the patent; between patents and plant variety protection, on the other hand, there were far-reaching differences. There was no need to go into detail and emphasize that plant variety protection law had an organizational structure specially adapted to living matter, although that should really be taken into account in the discussion.

27. Mr. Schlosser concluded that there were two organizations in favor of deletion of Article 2(1), two reserved their positions, and one was strongly against deletion.

28.1 Dr. von Pechmann (AIPPI) referred to the fact that patent protection required disclosure, which, when related to the state of the art, permitted further carrying out of the invention. That condition was one of the reasons for which patent protection had been considered unsuitable for plant varieties, as a renewed application of a breeding process afforded no assurance of renewed production of the same result. The same had been true of microbiological inventions, yet the problem had been solved by the requirement of a deposit of the new organism concerned, samples of which could then be furnished to third parties. That solution had also been introduced for plants in the United States of America as a result of the Hibberd decision. If seed were deposited, then the same situation would arise as for an inventor in the field of microbiology, who did not absolutely have to present his disclosure in such a way as to make a renewed application of the whole breeding process possible for a third party, but merely had to guarantee that his new breeding result was at the disposal of the general public for subsequent verification. Work was currently going on at the US Patent Office on a draft of guidelines for the deposit of biological material in the broadest sense, and Mr. Schlosser was in fact the person to be consulted on the subject. Although Mr. Schlosser was endeavoring to conduct the present meeting as a neutral Chairman, he had nevertheless been very deeply involved with the matter of the deposit of biological organisms for the purposes of patent protection.

28.2 Dr. von Pechmann referred further to a recent announcement in the Official Journal of the European Patent Office, according to which a depositary authority under the Budapest Treaty had declared that it would accept the seeds of new plant varieties. That announcement reassured Dr. von Pechmann that, in the European patent system too, the deposit of seed was regarded as a substitute for renewed breeding work. That was a step forward in development towards general patent protection, on condition of course that the relevant claim did not relate to a plant variety, in view of Article 53(b) of the European Patent Convention. That had to be stressed again and again at the present meeting.

29. Mr. Smolders (ICC), commenting on Mr. Schlosser's earlier explanations on duplicate and alternate protection, said that plant variety protection and patent protection were based on totally different concepts. Therefore, it was highly unlikely that there would be a real case of duplicate protection and this was therefore a hypothetical problem. Therefore also, the improvement of plant variety protection would not make the abolition of Article 2 unnecessary.

30. Mr. Schlosser opened the discussion on Article 2, paragraph (2), mentioning that all the written submissions of the organizations set out in document IOM/III/3 proposed that paragraph (2) should be deleted.

31. Mr. Slocock (AIPH) said that although his organization had not made a written submission on this point, it could agree to the proposed deletion.

Article 3 (National Treatment; Reciprocity)

32. Mr. Schlosser then turned to Article 3. He asked whether there was support for retaining paragraph (3), i.e., the possibility of requiring reciprocity. There was none.

Article 4 (Botanical Genera and Species Which Must or May be Protected)

33. Mr. Schlosser then turned to Article 4. He felt that there was general agreement among the international organizations, if not unanimity, that protection should be available for more genera and species, that paragraphs (4) and (5) should be deleted as a result and that member States should rely more heavily on multilateral and bilateral agreements on cooperation in examination to achieve that result. Mr. Schlosser said that member States were very concerned about the problem and were making all possible efforts to extend protection to more genera and species. It was a matter under constant discussion in the Technical Committee, in the Administrative and Legal Committee and in the Council.

34. Mr. Roberts (ICC) said that his organization would have considerable doubts about an extension to all genera and species, if it was not decided to amend Article 2. The ICC's support for extension was contingent on Article 2 being appropriately amended.

35. Mr. Clucas (ASSINSEL) said that his organization was clearly in favor of extension of the number of protected species, but was also conscious of the costs involved and the need for flexibility. One of the important considerations in the context of the revision of the Convention was that the needs of breeders and the administrative and technical requirements differed from one species to another.

36. Mr. Winter (COMASSO) said that the breeders represented within COMASSO were of the opinion that the greatest possible number of species should be protected everywhere. Such extension was moreover in the general interest. Yet COMASSO was also aware of the technical problems and was wondering whether, as a first step, groups should not be created according to climatic zones. All the member States of the Union within any particular group would keep a uniform list of species eligible for protection. A second step would be to contemplate a supranational plant variety protection system.

37. Mr. Schlosser asked Mr. Slocock whether the three conditions listed for the AIPH position under Article 4 were disjunctive, i.e., that it was not proposed that they should be met simultaneously for protection to be accorded.

38. Mr. Slocock (AIPH) replied affirmatively. He also said that AIPH wished to see the coverage of the UPOV Convention substantially increased, as this was not only in the interest of breeders but also in the interest of all. The practical difficulties which would follow a dramatic increase in the number of types of plants covered were considerable, but there were practical solutions.

39. Mr. Schlosser also said--and Mr. Slocock agreed--that he understood AIPH's proposal to relate to genera and species for which at least one member State provided for examination including official growing tests and to member States which provided for such examination.

40.1 Mr. Royon (CIOPORA) recalled that CIOPORA had already submitted a written opinion on the subject many years previously, and wished to subscribe to the statements made by Mr. Clucas. A flexible attitude had to be adopted for the implementation of the provisions concerning prior examination and the extension of protection to different genera and species.

40.2 Mr. Royon then pointed out that it was against the law to demand the existence of a particular economic situation, for instance breeding work in progress, for protection to be extended to a species. It was quite possible, for instance, for isolated breeders to be working on species that were not at all important, and which could precisely become important if the breeders' rights could be protected.

40.3 Finally Mr. Royon drew attention to the practical problems that might arise with respect to infringement actions when protection was extended to a species on the basis of bilateral agreements on cooperation in examination, and when allegedly infringing plants were seized in a country that did not carry out prior examination and therefore had no official experts. It would be necessary to provide also in the agreement for collaboration between the member States of UPOV in the comparative cultivation of seized plants and reference plants.

41. Mr. Schlosser said that governments that had a requirement for official growing tests had to face limitations in time, personnel and finances. UPOV member States were looking forward to the sharing of test results to overcome those limitations and to make their lists of protected genera and species as broad as possible. How the Convention would be revised in the light of requirements and limitations was not yet known, but UPOV would do its utmost to extend the lists of protected genera and species and would welcome suggestions from the international organizations in this respect.

42. Mr. Slocock (AIPH) referred to Mr. Schlosser's comment on paragraph c of the submission by AIPH concerning Article 4(3), as recorded in document IOM/III/3, and agreed with it. Under present arrangements, one should have added the words "and for which testing or prior examination arrangements are available." However, the AIPH case was also that the provision of, and the resources required by, such testing arrangements placed the major restriction on the extension of protection to a large number of genera and species. Therefore it was to be hoped that the breeders' organizations would welcome a statement by a users' organization that it would be desirable to move to a situation where there was a much smaller demand placed on governmental examination and testing arrangements and a much greater responsibility placed on the breeder himself. This would be a major psychological shift in a number of countries but would also enable the rapid achievement of the coverage that was contemplated, and already provided in some countries. Mr. Slocock hoped that such a change would reduce pressure to open up to plant varieties some of the opportunities offered, or apparently offered, by the patent system.

43. Dr. Böringer (Federal Republic of Germany) said that the question of the extension of protection to as large a number of taxa as possible and the question of the type of examination were related. He had the utmost understanding for the associations' stated desire that the number of taxa eligible for protection should be as large as possible, and indeed agreed with them. The question was how far one could go. It had to be borne in mind that most member States were not in a position to assure all or a large number of taxa of eligibility for protection at the outset by means of official examination. Consideration should therefore be given to ways in which such an aim could be achieved in stages. In that connection he would welcome further suggestions from the organizations. Some had submitted priority lists. There were other possibilities to be discussed, however, one of which Mr. Slocock had mentioned, namely the lowering of the standard of technical examination.

44. Mr. Winter (COMASSO) felt that the problem lay not so much in the number of species eligible for protection as in the inadequate harmonization of lists of species. A minimum requirement should be that a species for which protection and testing facilities existed in a member State be also eligible for protection in all other member States. A development of the excellent system of the taking over of test results could go a long way towards solving the problem.

45. Dr. Böringer (Federal Republic of Germany) referred to the comment by Mr. Winter on the centralization of testing and the taking over of test results. He too thought that they were desirable and would enable progress to be made. He sometimes doubted, however, whether the breeders concerned would be prepared to allow the examination of their varieties to take place in another member State when the situation arose. That was an item for the discussion that might eventually bring about an improvement in the situation.

46. Mr. Schlosser thanked Dr. Böringer for his suggestion. As a general point, he noted that it should be understood that the absence of comments by the delegates of the member States did not necessarily indicate agreement with the ideas expressed, but merely that those delegates understood the presentations.

Article 5 (Rights Protected; Scope of Protection)

47.1 Mr. Schlosser opened the discussion on Article 5. It seemed to him from the written submissions that there was dissatisfaction with the Article, either concerning the language or the substance. Basically, paragraph (1) now provided protection only for propagating material as such and a number of international organizations had pointed out that its application to ornamentals was unclear. Every organization that had commented on the Article had suggested that it be strengthened, i.e., that it provide more rights to breeders. The suggestions, if they could be generalized, had taken the form that something akin to patent rights should be provided, i.e., that infringement of a plant breeder's right should occur for any commercialization of the protected material without limiting that material to propagating material. One organization had referred to the orchard problem and explained the total unfairness of someone being able to purchase one apple-tree, propagate an orchard from the apple-tree and enter the apple business on the payment of a single royalty for a single tree.

47.2 Some concern had been expressed about Article 5(3). There had been unanimity that the "research exemption" should be kept. The phrase "for the marketing of such varieties," which followed the research exemption, seemed to

some to be a categorical authorization to market a variety developed from an earlier variety, even if that marketed variety did not meet a minimum distance requirement. FIS had mentioned the possibility of a compulsory license for use of a patented gene in development work, a comment also directed to Article 5(3).

47.3 Mr. Schlosser, reverting to the fact that everyone felt that protection should be strengthened, asked what form that stronger protection should take.

48.1 Mr. Royon (CIOPORA) expressed satisfaction with the fact that a very large number of international organizations wished, as CIOPORA itself had wished for 25 years already, to see Article 5 revised in its entirety. With regard to the detailed reasons for which the present Article 5(1) was unsatisfactory in the opinion of breeders, Mr. Royon referred to the Acts of the 1961 Paris and 1978 Geneva Conferences, and to the many and detailed observations that CIOPORA had made. He also referred to the observations recorded in document IOM/III/3, and pointed out that it was essential, when the rights of the breeder were considered, that reference be made above all to the various stratagems to which infringers resorted in order to circumvent those rights. In order to encompass all cases, one had to start with the practical experience of breeders, who knew only too well how their varieties were exploited by third parties without any remuneration being paid to them. Moreover, as in the case of patents, a very general protection had to be given that related essentially to the commercial exploitation of the variety in whatever form. One of the main shortcomings of Article 5 of the Convention was that it went into too much detail and also made use of a definition of products that was extremely narrow, as it covered only reproductive or vegetative propagating material as such.

48.2 Finally, CIOPORA wished, as it had already wished in 1978, to see the improved definition of breeders' rights actually written into the text of the Convention, to avoid a situation where one had to await the implementation by the various States of a mere recommendation. The 1978 Conference had ended with a recommendation that had proved little better than wishful thinking if one considered the amount of legislation that had been devised and amended since.

49. Mr. Roberts (ICC) said that his organization, like CIOPORA, was pleased that there was general agreement among the international organizations that the protection for the breeder should be strengthened; the ICC had proposed that the Convention should state that the breeder received the exclusive right to exploit his variety commercially. Mr. Roberts thought that that was identical with what CIOPORA had put forward and, on behalf of the ICC, he supported the CIOPORA proposal fully.

50.1 Mr. Slocock (AIPH) felt sure that caution was required with a statement that a view was generally acceptable or a solution advocated by the non-governmental organizations because, in the case of such a complex article as Article 5, it could be a too broad generalization. He could not agree with the philosophy which CIOPORA and ICC had expounded in the form in which they stated it. AIPH had made suggestions to which he was sure that all would give careful thought. Those suggestions were an attempt to bring up-to-date the general philosophy of the Article in the light of technological improvements and advances.

50.2 On the other hand, AIPH could agree with some of its colleague organizations in respect of deletion of the words "and for the marketing of such varieties" in paragraph (3) because AIPH was anxious to permit the progress of

research and not in any way to inhibit it. However, it could not accept a fundamental review of this Article, and felt that it was appropriate to limit protection to propagating material. Where this was proved to be inadequate and where a breeder did not obtain proper remuneration from this source, then an extension to other material could be envisaged. However, to accept the extension as a matter of course would be wholly unacceptable to AIPH.

51. Mr. Clucas (ASSINSEL) said that his organization was fully supportive of the other speakers who had mentioned the need for expanding the scope of protection. One of the major concerns, as was mentioned by Mr. Slocock, was the advance of technology. So far there had been very little pressure from vegetable breeders to gain protection for a number of species because hybrid varieties had in fact provided an in-built biological protection. Since the development of plant tissue culture might at some stage become semi-automated and developed to a very highly efficient state, it might well be that that technology alone would bypass the seed route through which the natural "biological protection" operated. Therefore, there was a need to extend the scope of protection. There was also a need to bring in a principle of flexibility because what was applicable to one species might not be applicable to another. For example, in certain species, it might be appropriate to protect the final product because that was the only way by which the breeder could receive his return. In others, it might be sufficient to relate protection to the propagating material.

52. Mr. Schlosser said that the meeting appreciated receiving ASSINSEL's position and any revision of the Convention would certainly contemplate one of the problems raised by ASSINSEL, namely the micropropagation problem.

53.1 Mr. Winter (COMASSO) noted that all speakers had agreed on the need to extend both the content and the subject matter of protection. The breeders represented within COMASSO felt in respect of the acts of utilization that extension to any type of commercial use of protected subject matter should be envisaged. For instance, contractual seed processing should be covered. With regard to the subject matter of protection, the question should be raised whether the rights should concern not only propagating material, but also any other kind of variety material. This, however, would require a correction to the comments reproduced on page 10 of document IOM/III/3: the term "variety material" should refer to material from which whole plants could be generated. This term would extend to cells, where they meet the requisites referred to, but not to cell cultures or parts of cells; on the other hand, it would extend to the final product. COMASSO held that protection of the final product should be basically aimed at ornamentals and not necessarily extended to all species.

53.2 The problematic matter of the so-called farmer's privilege should not be explicitly regulated in the Convention, i.e., a privilege should not be anchored therein. It should be left to the national lawmaker to grant an exception to variety protection and to the courts to interpret that exception, where afforded, as narrowly as possible.

53.3 The breeders who belonged to COMASSO were unreservedly in favor of maintaining the "breeding exemption" in respect of a variety protected under the UPOV Convention. They were aware, on the other hand, that the possibility of protection (e.g. by patents) for genetic components could indeed lead to overlapping between patents and plant breeders' rights. They were also aware of the fact that certain principles of patent law developed for technical subject matters, such as that of exhaustion of rights, were not adapted to the field of self-replicating material. It seemed to them impossible to devise appropriate rules within the framework of UPOV. Those should be left to the patent

field. Nevertheless, it was altogether worth thinking of the possibility of regulating possible overlapping of rights within the framework of reciprocal licensing agreements. The breeders grouped together in COMASSO were altogether willing to take that approach.

54. Mr. Schlosser said that some of the items raised by Mr. Winter were very provocative and deserved a great deal of discussion, especially the "farmer's privilege" and the overlapping between patents and plant breeders' rights. These questions would also be considered in connection with document IOM/III/2.

55.1 Dr. von Pechmann (AIPPI) reminded the meeting that AIPPI was one of the largest international organizations in the field of industrial property. It had concerned itself for a long time already with the matter of scope of protection and had already pointed out at the first and second meetings with international organizations that it understood those arguments put forward by CIOPORA and COMASSO and that it also went along with them. AIPPI also held that the protection under Article 5 of the Convention was not adequate. Dr. von Pechmann had already pointed out at the beginning that the purpose of a system of protection was to provide an incentive for achievements and also a reward. However, in recent years, the concern that such reward was no longer assured as a result of the excessively narrow definition of protection had become ever greater, particularly in view of the possibilities afforded by genetic engineering for breeding new species.

55.2 In that connection, the provisions of paragraph (3) were held to be particularly dangerous for such developments. The genetic engineering breeders, who achieved their results, or would achieve them, only at the cost of enormous expense and lengthy periods of time, feared that their achievements, that were of service to the general community, could not be rewarded commensurately if they were freely available to competitors for them to produce their own developments. The AIPPI Special Committee on Plant Variety Protection had examined those provisions with special care and wished to submit a proposal to the meeting. It was of the opinion that the free utilization of a protected plant variety for further breeding work should be maintained; however, at the same time it should be associated with an obligation to pay an appropriate utilization fee for the commercial exploitation of a resultant new variety where such a variety continued to possess those characteristics that had determined the grant of protection to the original variety.

55.3 Dr. von Pechmann believed that demand to be justified. During the discussions, consideration had been given to the question whether such a provision should be adjusted to genetic engineering developments. However, Dr. von Pechmann felt that such would not be justified. The matter had been raised at the Symposium on the occasion of the twenty-fifth anniversary of the UPOV Convention last year in Paris and one of the speakers had said that, if protection for genetically-engineered varieties was to be extended, the "conventional" or "traditional" breeders would naturally also wish to enjoy that extension. It was therefore to be assumed that the demand was in no way limited to breeders who worked with genetic engineering methods, i.e., new developments, but that it was a demand that would be taken up by all other breeders.

55.4 In that connection, Dr. von Pechmann finally wished to point out that the provisions of Article 5(3) were addressed exclusively to the breeders. In other words, it was the breeders themselves who wished to have a protective effect that would also operate against them. This showed that the search for a balance between the interests of the community and those of the breeders did

not have to be primary since it was a matter that affected the breeders only and concerned only them. Thus, such a demand, when advanced by the breeders, should be taken seriously.

56. Mr. Schlosser understood that Dr. von Pechmann was suggesting that the breeder could seek to develop a new variety on the basis of a protected variety and market it provided he paid royalties under a compulsory license to the holder of the right. Mr. Schlosser wished to postpone discussion of the question of compulsory licenses and return to the basic question being discussed, namely whether there was a need for enlarged protection to cover more than propagating material.

57.1 Mr. Royon (CIOPORA) thought it regrettable to attempt to adapt legislative texts to the development of technology. It seemed to him that the lawyers should try to look further ahead than the technologies, through texts that were sufficiently general. As regards the problems currently caused by in vitro reproduction, it had been previously observed that it was only at the time of sale or marketing of the finished product that propagation could be determined with accuracy. However, breeders of ornamental plants propagated by vegetative means had long been aware of that problem: it was absolutely impossible to determine the variety growing in a greenhouse where there was nothing but small herbaceous cuttings or plantlets that had just been grafted. That was indeed one of the reasons for which CIOPORA wished for a general wording.

57.2 Mr. Royon observed that, at present, only the minimum protection afforded by Article 5(1) was compulsory for the member States of UPOV. It was common knowledge that the minimum in fact amounted to a complete absence of protection for fruit species. It was therefore the definition of the minimum that had to be reviewed.

58. Mr. Slocock (AIPH) said that he did not welcome the suggestion that Article 5 could be replaced by a general statement of aim or objective. He thought that the Convention had to be precise here, and it had to be precisely relevant to the state of the technical art which applied at the time. It was quite natural and acceptable that the Convention should have to be amended from time to time in order to reflect the technical advances which had been made, but it seemed to Mr. Slocock to be a counsel of despair to replace Article 5 by a much more general statement which was capable of different interpretations. Referring to what had become "the CIOPORA suggestion," he said that this was taken into account in the present wording of the Article. Growers recognized that there were situations which could arise where the propagating material was not the adequate source of a return to the breeder, and the present Convention provided for other alternatives, but in AIPH's view it would be wrong to write those alternatives in as a mandatory procedure.

59. Mr. Schlosser asked Mr. Slocock whether he was concerned that a shorter formulation of the rights of the breeder would, of its very nature, be more submissible to different interpretations.

60. Mr. Slocock (AIPH) replied that this was his concern and that any general statement along the lines which had been suggested by some of the speakers would merely substitute an out-of-date wording by one which was capable of confusion and misinterpretation. That would not be an improvement.

61. Mr. Schlosser added that, from his personal point of view, he did not think that longer texts lacked opportunities for different interpretations, and he thought that that was a problem.

62. Mr. Slocock (AIPH) replied that brevity, in itself, should not be an objective.

63. Mr. Schlosser recalled that Mr. Royon had made the point that an adequate level of protection was not mandatory in the Convention. It was rather an option which States might or might not exercise, and if they did not give more than the minimum required, breeders of ornamentals and a number of other species would find themselves in great difficulties.

64. Mr. Slocock (AIPH) said that it would not be right that the breeder should be the arbiter as to whether he was obtaining an adequate return from propagating material. There was a provision in the Convention whereby member States considering that such return was not guaranteed could offer other sources of remuneration to the breeder.

65. Mr. Royon (CIOPORA) said that what he had said earlier did not imply that CIOPORA wanted the wording of Article 5 to be imprecise. CIOPORA wanted the wording to be as precise as possible.

66.1 Mr. Petit-Pigeard (COMASSO) observed that, in the light of the discussions, it would seem easier to change the texts than the thinking. In the case in point, there were two ways of looking at things: the first was to adapt the texts to the needs and the second to make use of the existing texts in order to defend one's rights. Defending rights meant asking experts, lawyers and courts to define both the context and the limits. It was always extremely difficult to enter the limits of breeders' rights in the text of an article since, by definition, they varied as a function of technology. Common sense, reason and equity alone could define those limits. It was not for the breeder to do so, but for the lawmaker and the courts. Seeds, plantlets or parts of plants, whatever their form, were a means of producing protected material. The problem derived from the fact that proof had to be furnished that the material was of the protected variety.

66.2 Returning to the statement that the content of the "farmer's privilege" had to be defined, Mr. Petit-Pigeard held that it was in fact the content of the breeders' rights that had to be set out. Firmness had to be shown on three points: to refuse to change the texts as a whole on the basis of limited and short-term interests, but to analyze what was covered by the existing texts which, until proved otherwise, were not that bad in some countries, and to use them; to wait until case law had been developed, since it was as yet very limited, or even non-existent, before attempting to modify the Convention; finally, to avoid speaking of so-called privileges--which did not exist, or at least not everywhere--or of so-called limits on the breeders' rights.

67. Mr. Royon (CIOPORA) wished to support fully what had just been said by Mr. Petit-Pigeard from a general point of view. However, Mr. Royon felt that it was extremely urgent--as it had already been in 1978--to review Article 5 in detail. Although breeders had the possibility of applying to the courts in those countries where national legislation was sufficiently strong, that was not the case in a large number of countries. To give an example often cited by CIOPORA, the French plant variety protection legislation gave full satisfaction to the breeder members of CIOPORA. However, in countries such as the Federal Republic of Germany, Denmark, Spain or the Netherlands, breeders were nothing like as well armed and it was therefore essential that something be done in the Convention.

68. Mr. Schlosser concluded the discussion on Article 5(1), stating that the member States realized that there was a general, if not unanimous, sentiment in the meeting for a strengthening of the scope of protection. He then turned

to Article 5(3) and reminded the meeting of Dr. von Pechmann's suggestion that a breeder should be required to pay a compulsory license in respect of commercialization of a new variety (see paragraphs 55.2 to 55.4).

69. Mr. Clucas (ASSINSEL) said that ASSINSEL recognized that the "research exemption" had played a very important part in the tremendous progress in crop improvement by genetic means over the last two or three decades. It recognized that this had to be allowed to continue. Mr. Clucas thought that ASSINSEL would be very supportive of the general principle put forward by Dr. von Pechmann whereby, if breeding material was used by another in the development of a variety, then there should be some means by which the creator of that original material should be recompensed.

70. Mr. Roberts (ICC) said that his organization supported the "research exemption," but this support did not extend to an "exploitation exemption." Concerning Dr. von Pechmann's proposal, the ICC considered that it was very beneficial that the owner of a patent on a gene should receive remuneration rather than everyone being entitled to use this patented gene free. Apart from that, the ICC was not happy with the proposal. The principle of compulsory licenses was one which had been much discussed in the patent world and research-based industry was extremely antipathetic to them. The ICC did not see that they provided the benefits which those who proposed them sought, and thus was reluctant to see them adopted in this area. Mr. Roberts asked why compulsory licenses should be necessary here when they were not necessary in other important areas.

71. Mr. Royon (CIOPORA) repeated that CIOPORA was satisfied with the current wording of Article 5(3), except for the phrase "for the marketing of such varieties." The proposed deletion of that phrase was not intended to create a situation of dependency in the sense explained by Dr. von Pechmann for the marketing of varieties deriving from protected varieties. On the other hand, CIOPORA felt that the current wording could be interpreted to permit anyone to use a protected variety in order to breed a new variety and to market the latter variety even where it constituted an infringement or was too close to the original protected variety. It was to make the situation more clear in the event of infringement that CIOPORA wished to delete that phrase. Its point of view could indeed be linked with that of COMASSO.

72. Mr. Schlosser said that a number of organizations had commented on that particular phrase and suggested its deletion for precisely the reason stated by Mr. Royon. However, the provision might also serve a useful purpose and might therefore only need a drafting improvement. There could be situations where one person conducted the research, developed a new plant and sold it to someone else, so that the person who did the research did not do the commercialization and the person who did the commercialization did not do the research. The provision under consideration made both of them liable for infringement.

73. Mr. Williams (AIPPI) said that, speaking from the point of view of the United States group of AIPPI, there was really no basis for singling out biotechnology, the seed industry, the horticultural industry, or any other industry, for the purposes of establishing a compulsory licensing system. Concerning the suggestion that there might be a problem when the development and the marketing were done by two different people, Mr. Williams suggested that a sale of the research interest would take it out of the development stage and would put it into the commercial stage.

74.1 Mr. Petit-Pigeard (COMASSO) emphasized that Article 5(3) was one of the foundations of the Convention. Genetic material was the very basis of breeders' work. It was not reasonable to prevent breeders from having access to protected varieties as an initial source of variation, that is to say as material used in research work. The fathers of the Convention had felt it necessary to detail two points: a variety could be used in breeding work and, where the improvement was considerable and met the conditions of distinctness, homogeneity and stability, it constituted a new variety in respect of which the breeder of the original variety had no further rights; on the other hand, particularly in the case of hybrids, the consent of the breeder of the original variety was needed where that variety had to be used, combined with another variety, in a repetitive manner.

74.2 There was no question, at the time, of genetic material that was internal in the plant. It was therefore not unreasonable to wish to revise that Article to allow for the progress that had been made in the field of genetics. However, if it was wished to institute a kind of patent of improvement or compulsory license or the principle of agreement between two parties, the extent of the problem would have to be identified and the implications of the new system taken into account. If there was to be a link of dependency between the varieties, it was quite possible that the system would become unmanageable within a few years.

75. Dr. Lange (ASSINSEL) held that the breeding exemption contained in Article 5(3) should not be inconsiderately relinquished. It was not only a matter of a "research exemption" since the commercial distribution of the derived variety was also covered by that provision. That was one of the essentials of the Convention. There would be no great advantage in deleting it. The real problem was to know the true extent of patent protection for products such as genes implanted in plant material, that is to say varieties. That question would seem as yet unanswered in patent law. For instance, would the marketing of a variety containing a patented gene constitute utilization of the protected invention of the gene? Would production of plant material containing a patented gene constitute manufacture of the patented invention? And what advantage would patent protection have for the owner in any event if the principle of exhaustion of rights was to be applied in full? There remained many unanswered questions in that field, not the field of the Convention, but that of patent law. Dr. Lange could therefore not see his way to agreeing to a change in Article 5(3) until the patent law issues had been definitively clarified.

76. In response to Dr. Lange, Mr. Schlosser said that the question being discussed was whether there ought to be a "research exemption" under the UPOV Convention and, if there was to be one, whether the final phrase should be retained as part of that exemption. The issues raised by Dr. Lange were critically important and he suggested that they should be discussed afterwards.

77. Dr. von Pechmann (AIPPI) pointed out that in the proposal made by AIPPI, the "research exemption" had been recognized without further restriction. However, according to that proposal, the commercial exploitation of a variety based on the achievement of another person should imply payment of compensation. That principle, which was similar in a certain way to a compulsory license, had been opposed on the grounds of the situation that would arise when the second variety was used to breed a third, and so on. The question was therefore one of the "dependency pyramid." This factor had of course to be taken seriously. However, there existed the possibility of making the term of validity of the provision on dependency--which lead to the obligation to pay remuneration, and not to a right of prohibition, in respect of the further

variety--shorter than that of the right of protection as such. That possibility had also been considered by the AIPPI Working Party, which had not as yet formulated a definitive opinion.

78. Mr. Royon (CIOPORA) shared the views of Mr. Winter that clear and simple concepts had to be maintained. He felt that the questions raised by Dr. Lange as regards application of the principle of dependency to patented genes incorporated in varieties should not be discussed at that juncture but should be approached in relation to document IOM/III/2. As far as the varieties themselves were concerned, Mr. Royon held that there would not appear to be any basic difference between a patent and a plant variety certificate. Indeed, the rights afforded by a patent did not extend to acts carried out experimentally where those concerned the subject matter of the patented invention. A patent enabled patented inventions to be used in order to conceive new inventions, as a direct development, but on condition that the new inventions were new in the patent law sense. That was exactly the principle contained in Article 5(3) of the UPOV Convention. There was thus no reason to oppose the two systems and it was therefore appropriate to maintain the principle of that Article, as currently drafted, with the exception of the end of the first sentence, for the reasons already explained.

79. Mr. Le Buanec (ASSINSEL) pointed out that the position of ASSINSEL was not as yet final on the matter under discussion, but that, it would seem, there was agreement to ask for amendments to the Convention that would lead to a strengthening of the breeders' rights. The proposal made by AIPPI, which appeared interesting for many of the ASSINSEL members, went in the right direction but the terms of application would have to be defined. The most frequently heard criticism was indeed the pyramid aspect of the system of dependency. However, account had to be taken of the speed at which progress was achieved in plant breeding. Even with the new techniques, it would still take at least four or five years to obtain a new variety and probably more to arrive at the commercial stage. Thus the importance of the pyramid should not be overestimated. Indeed, it would be possible to carry out a simulation using a number of varieties already on the market to ascertain up to which preceding generation dependency would extend.

80. Dr. von Pechmann (AIPPI) wished to state, as a result of discussions during the lunch break, that AIPPI's proposal referred solely to a change in Article 5(3). It was not a proposal to introduce a compulsory license, as discussed, in the event of patent protection for plants; its purpose was in fact to place a limitation on paragraph (3), that currently provided for completely free utilization, insofar as a royalty would be paid where the characteristics of the original protected variety were still present in the subsequent variety.

81. Mr. Slocock (AIPH) said that his organization subscribed to the view of CIOPORA and other organizations that the words "for the marketing of such varieties" should be deleted. However, access to true genetic material as envisaged in the opening words of paragraph (3), should be maintained. If there was any suggestion that access should be limited in any way, AIPH would insist that any dependent right should be accompanied by some machinery of compulsory licenses to ensure that there was a free flow of genetic material.

82. Dr. Böringer (Federal Republic of Germany) wished to return to the proposal made by Dr. von Pechmann. The proposed system would mean, to begin with, that in the event of a dispute the courts would have to decide whether there existed dependency. That was an element that might possibly lead to hefty disputes within breeding circles. Dr. Böringer was keen to hear the views of the breeders on that issue.

83. Mr. Le Buanec (ASSINSEL) felt that there existed at present techniques that were increasingly effective in determining relationships in the vegetable kingdom. It was extremely difficult to say, on the basis of morphological characteristics, whether a variety derived from another or not; however, molecular probes were soon to provide certainty in that matter.

84. Dr. von Pechmann (AIPPI) wished to reply to the question put by Dr. Böringer. The same problem arose in every action for infringement. The defendant always claimed that he was not using the protected variety and the court had to determine, by means of an expert opinion, whether the material in question possessed the characteristics that had led to protection of the original variety. It would be quite simply unfair, should it some time prove possible to insert into a wheat variety the famous and highly desirable assimilation of nitrogen as was possessed by the leguminosae, i.e., where use of that variety remained free in order to transfer that property to subsequent varieties by simple crossing, that was to say where not a penny was paid towards the hundreds of millions of dollars that the development work might have cost for the production of the initial wheat variety. The first breeder would therefore simply not receive the well-deserved remuneration for his achievements. That was why the ruling contained in Article 5(3) was held to be unfair and why AIPPI sought to achieve equity through an obligation to pay appropriate remuneration for the use of a protected variety that had been given new properties.

85. Mr. Desprez (COMASSO) emphasized that, according to the proposal under discussion, "traditional" breeders who had been creating varieties for generations would receive nothing, contrary to the breeder who had introduced into a wheat variety--probably a high-yield variety--nitrogen-fixing genes that existed in nature. Mr. Desprez considered that absolutely abnormal and unjust.

86. Mr. Schlosser then summarized briefly the discussions on Article 5: there was undoubtedly a strong, if not unanimous case, for extension of the rights available to breeders under paragraph (1); a strong case could be made for the "breeders' exemption," and the Council of UPOV would have to consider the proposals concerning it, including the AIPPI proposal; there was unanimous agreement that the phrase "for the marketing of such varieties" should be deleted from paragraph (3).

Article 6(1)(a): Distinctness

87.1 Mr. Schlosser opened the discussion on Article 6(1)(a). The major issues were the determination of the "important characteristics" and the "clear differences" ("minimum distances"). From the comments that were submitted in document IOM/III/3, there seemed to be a general agreement on the need for minimum distances, defined species by species, to be great enough to prevent or discourage plagiarism.

87.2 Mr. Schlosser then invited comments on a suggestion that the minimum distance requirement should be specified as "adequate" or "substantial" or in some other way to assure against plagiarism of a variety.

88. Mr. Desprez (COMASSO) stated that the experts who carried out prior examination in the field were the most qualified for determining minimum distances. It was a practical problem that concerned the experts and which could not be resolved in the texts.

89. Mr. Schlosser agreed that it was for technicians to measure the minimum distances, but the meeting could consider, for example, whether the minimum distance requirement would be met by a variety that was barely distinguishable from a protected variety, perhaps in a characteristic that some would regard as having no agronomic importance. The question was whether those kinds of varieties, which some referred to as plagiarizing varieties or cosmetically altered varieties, should be eligible for protection on their own, that is, whether they were, in fact, new varieties.

90. Mr. Slocock (AIPH) said that it would be very difficult to have a discussion of this kind without reference both to the text of Article 6(1)(a) and to other aspects which fell outside the Convention. He said that, for some time, AIPH had put the view to UPOV that although the Convention itself required a difference for one or more important characteristics to distinguish a new variety, the criteria adopted by those involved in drawing up the Test Guidelines had made the opportunity for "plagiarism" a very much open one. It seemed to AIPH that the distinguishing features which had been listed in the Test Guidelines trespassed into very small botanically, horticulturally and commercially unimportant features. Thus, it seemed that it was necessary either to amend the Convention, to make it clearer what was meant by "one or more important characteristics," or to make sure that UPOV itself would place a very different interpretation on those words in practice. AIPH would welcome the extension of the minimum distances, but that could only be achieved, Mr. Slocock said, if different criteria were used by those responsible for drawing up Test Guidelines and implementing them.

91. Mr. Petit-Pigeard (COMASSO) said that the role of the experts was to be maintained in its totality. He felt it would be a step in the wrong direction to reduce the important characteristics referred to in Article 6(1)(a) to those important from an economic or commercial point of view. The experts quite rightly selected characteristics that could be qualified as dominating and characteristics that were "dominated." The experts for each species should be left enough room to define, together with the users, those characteristics that were to be used for the purposes of Article 6(1)(a).

92. Mr. Clucas (ASSINSEL) said that the view within ASSINSEL was that it was necessary to redefine "important characteristics" and "clear difference" ("minimum distance") and, in addition, to look very closely at new techniques which might help to distinguish more clearly between varieties. Probably all recognized that this was an area in which guidance had to be given, to a large extent, by those who had to do the work.

93.1 Mr. Royon (CIOPORA) shared the view of Mr. Desprez that the question of prior examination of characteristics of varieties was a matter for the field, that is to say for the experts. Nevertheless, he felt it necessary that the Convention should acknowledge the varieties' "perimeter of protection" more strongly and should extend it. As far as infringement was concerned, the basic question was whether that concept of infringement related only to "the" variety or whether, on the contrary, it extended to the parasite "varieties" that approached all too closely to the protected variety. CIOPORA wished the concept of minimum distances to be chosen, although acknowledging, on the basis of the experience of its members who participated in the expert committees, how difficult it was in the texts to define that concept with sufficient flexibility to allow for the special features of each species. It hoped that the concept would be confirmed in the Convention in order to avoid protection being afforded to a variety held to be new on the basis of a very secondary characteristic. That concept would also make it possible to resolve, to a

certain extent, the familiar problem of parasite mutations that occasionally constituted an easy way out for unscrupulous people to avoid paying royalties on protected varieties.

93.2 As far as the principles of homogeneity and stability were concerned, CIOPORA also felt that these should be maintained and it had not altogether understood the comments made by AIPH as reproduced in document IOM/III/3.

94. Mr. Slocock (AIPH) said that it was a problem that very large numbers of characteristics were listed in the Test Guidelines. AIPH took the view that not all of them fell into the category of "important" in the meaning of Article 6(1)(a), although it was the view of UPOV that this was the case. It was creating a problem to cite 50, 60 or 70 characteristics in the case of an ornamental species and to say that each of those was equally important. In the context of plant breeders' rights and production, this helped neither the breeder nor the grower and it positively encouraged plagiarism. Furthermore, it made testing and prior examination procedures prohibitively expensive. AIPH therefore suggested that the Technical Working Parties be encouraged to identify the characteristics that were really important.

95. In response to Mr. Slocock's observations, Mr. Schlosser said that "important" could have different meanings for different people. At one extreme, some would believe that the word enabled one to identify a new variety even though the characteristic might have no agronomical functional significance. Mr. Schlosser said that he assumed that Mr. Slocock wished that type of characteristic to be ignored. On the other, there were characteristics that were quite obviously important in the agronomic or the functional sense. And in between there were many characteristics creating some indefiniteness about the term "important."

96. Mr. Heuver (Netherlands) said that the subject of "minimum distances" had already been discussed for many years within UPOV. It seemed that it would not be possible to solve these problems immediately; he proposed therefore that experts from the breeders' organizations go through the Test Guidelines together with the governmental experts. This could be done in a small group for a few species, and it could be in the field or in the greenhouse rather than in an office.

97. Mr. Schlosser thanked Mr. Heuver for his suggestion, which, he said, had been made before the Administrative and Legal Committee. That Committee had urged Mr. Heuver to go forward with his suggestion in the Council, and Mr. Schlosser assumed that this would be done.

98. Dr. von Pechmann (AIPPI) commented that the question of minimum distances had been discussed at the two previous meetings and that AIPPI had advocated understanding the term "important characteristic" in the sense of an economically progressive characteristic. The purpose of granting an industrial property right was not solely to promote breeding, but also innovation. For a difference claimed in an application the applicant should be required to state the progress or advantage thus achieved for his variety. The authorities should then check whether the statement was correct and, if so, grant protection to the new variety. Dr. von Pechmann felt that the problem was not at all as difficult as it sounded in theory in the debates.

99. Mr. Espenhain said that the questions of clear differences and important characteristics had been discussed within various UPOV bodies, and it had been agreed that the Technical Working Parties should study these questions further. Mr. Espenhain thought that, in fact, there was already a hierarchical system

within the Test Guidelines, whereby some characteristics were considered to be more important than others. For a particular species, the question of minimum distances, Mr. Espenhain said, should be considered from characteristic to characteristic.

100. Mr. Urselmann (COMASSO) said that about two years ago, the vegetable breeders in the Netherlands started a discussion with the examining authorities concerning clear differences and important characteristics. The discussion proved to be very helpful for clarifying the issue and reaching a consensus. That was already difficult to reach on the national level and would be more difficult to reach on the international level. Nevertheless, discussions were indispensable to solve the problems.

101. Mr. Roberts (ICC) said that there was no comment from his organization on the question of important characteristics and clear differences because the members had not been consulted in detail about this. However, Mr. Roberts was sure that, as a matter of principle, the ICC would wish strongly to support the contention of AIPH that some characters were more important than others.

102. Mr. Schlosser agreed with the suggestion made by Mr. Heuver and further explained by Mr. Espenhain, that the way to solve these problems was for UPOV examiners to get together with private breeders to decide what the various terms should mean in each particular case.

103. Mr. Slocock (AIPH) welcomed the suggestion made. He was concerned by the statement contained in a recent UPOV document which said that all characteristics included in Test Guidelines documents were considered important in the context of Article 6(1)(a). UPOV had always taken this position, but it seemed to Mr. Slocock that this was an area for which more flexibility was required. There were strong arguments for a hierarchical approach to characteristics; but if this was not accepted by UPOV, there might be a prolonged problem.

104. Mr. Schlosser thanked Mr. Slocock for his statement and said that this question might not be a problem for long because it was one of the matters being discussed in the Administrative and Legal Committee of UPOV.

105.1 Dr. Böringer (Federal Republic of Germany) was in favor of Mr. Heuvers' proposal being discussed further among the UPOV member States. Discussion in the field or in the greenhouse would of course not give any help in a possible redrafting of Article 6, but would definitely make it easier to understand the problem.

105.2 Dr. Böringer pointed out that discussions were being held all the time at national and international levels. The professional bodies received the draft Test Guidelines for comment. They had also received the draft for the General Introduction to the Test Guidelines for their comment, together with the interpretation by the UPOV Council which formed the basis of current practice. It was therefore not true to state in general that the minimum distances were too small. Dr. Böringer considered that such was not the case. However, the question had to be looked at individually for each species and for each characteristic.

105.3 Dr. Böringer also held that, with a view to a possible revision of Article 6, a number of points had to be clarified to enable the professional bodies to take a stance.

(i) There should be a discussion on how to interpret "important" and whether the current interpretation had also to apply in future. In that

respect, all implications of a new interpretation would have to be weighed up. If more weight had to be given to the functional characteristics, that would make international collaboration much more difficult in the field of seed and varieties.

(ii) There should be a discussion on whether the Convention should continue to provide that a difference in one or more important characteristics was to lead to the recognition and protection of a "new" variety.

(iii) There should be a discussion on which minimum distances were to be applied, split up into qualitative and quantitative characteristics.

106. Mr. Clucas (ASSINSEL) said that it would not be possible for ASSINSEL to give an immediate answer to Dr. Böringer's request for opinions. ASSINSEL would like to continue with the discussion on the definition of the important characteristics and the minimum differences. Furthermore ASSINSEL was in favor of extending the discussion on the use of new tests and on the simplification of the procedures. ASSINSEL wished to consider the issues raised crop by crop and species by species, and to give an answer in due course.

107. Mr. Slocock (AIPH) said that his organization would be pleased to respond to the invitation given. His first impression, which was a considered one, was that AIPH could not suggest an improvement in the wording of the Convention. It was in the interpretation of the powerful word "important" where the problem, and its solution, lay.

Article 6(1)(b) to (e): Other Conditions for Protection

108. Mr. Schlosser then turned to Article 6(1)(b). He asked whether there were any comments on the periods set out in Article 6(1)(b)(ii), but none were made. He then said that AIPH had pointed out that nowhere was it clearly stated that the loss of homogeneity and stability should be grounds for nullity. Mr. Schlosser said that matter could be discussed in connection with Article 10. CIOPORA had questioned the phrase "precise description in a publication" and whether such a description was enough of a disclosure to block the grant of a plant breeder's right. Mr. Schlosser noted that that was a question relating to paragraph (1)(a) and asked Mr. Royon whether he wished to make any comments on it.

109. Mr. Royon (CIOPORA) said that the phrase "precise description in a publication" was borrowed from patent legislation. CIOPORA was of the view that this phrase should be taken away from the Convention because it was difficult to get hold of a variety if one did not have the propagating material of the variety. Moreover CIOPORA was of the view that it was going too far to hold that a variety was a matter of common knowledge if it had appeared on an exhibition pamphlet; only the commercial disclosure of the propagating material of the variety should constitute real disclosure of the variety.

110. Mr. Schlosser said that he understood Mr. Royon's concern since the phrase seemed to overlook the question whether the variety actually existed or could be conveniently found.

111. Mr. Royon (CIOPORA) referred to the comments made by AIPH on Article 6(1)(c) and (d) and emphasized that care must be taken in respect of the examination of homogeneity and of stability. Stability could sometimes be judged only over several generations and the prior examination in respect of distinctness already took up a great amount of time and occasionally led to excessive delays in the grant of a title of protection.

Article 7 (Official Examination of Varieties; Provisional Protection)

112. Mr. Schlosser then turned to Article 7 which, he said, essentially had two parts. One concerned examination and the other the possibility for member States of the Union to provide interim protection measures for the breeder against acts of infringement, before the certificate was issued. Concerning the first part, the suggestions received from the international organizations generally indicated that there should be more bilateral and multilateral testing arrangements and that possibly breeders should be allowed to conduct their own tests, with the member States being asked to accept the results of those tests. Mr. Schlosser asked if there were any comments on the first part of Article 7 but none were made. He then asked if there were any comments on the second part of the Article.

113. Mr. Petit-Pigeard (COMASSO) said that the system of provisional protection called for no criticism as to substance, but did raise a problem of time limits in the case of infringement actions. In France, where protection had been applied for but not as yet granted, legal proceedings had to be instituted immediately, by writ, and the decision was postponed to the date of publication of grant of the title. That was not without serious problem, particularly that of comprehension by the courts. Mr. Petit-Pigeard thought that the problem must also exist in the patent field and wished to know what type of transitional measures would enable infringement actions to be undertaken as of the filing date of the application for protection.

114. Mr. Williams (AIPPI) said that there were no provisions in the United States Patent Law for provisional protection dating from the time applications were filed. However, under the Plant Variety Protection Act, there was a provision providing for protection as from the date of notice, for instance through a label affixed on a seed bag, that an application for protection had been filed for a particular variety.

115. Mr. Royon (CIOPORA) referred to the question put by Mr. Petit-Pigeard. In France, for example, the problem was a relatively minor one since once there was knowledge of an infringement, it was possible to communicate to the presumed infringer an official copy of the application, thus enabling, once the title was granted, the infringing acts to be actioned retroactively as from that notification. However, in other countries, the breeder had no possibility of pursuing infringers nor even of granting licenses on the basis of the application. In view of the time required for granting a title of protection in some countries, such as Spain, certain producers systematically exploited new varieties up to the date of grant of the title. In that way, they were never in an infringing situation whilst largely benefiting all the time from the work of breeders. That problem could be solved, according to Mr. Royon, by setting the start of protection at the date of the application.

Article 8 (Period of Protection)

116. Mr. Schlosser then turned to Article 8. The suggestions, he said, seemed to center on the advisability of having a longer period of protection. If the term of protection started with the filing date of the application, that would tend to lead to a shorter term of protection. CIOPORA, in addition, had suggested that the duration of protection be harmonized in all member States. Mr. Schlosser called upon Mr. Royon to explain what was meant by harmonizing the duration of protection.

117.1 Mr. Royon (CIOPORA) explained that by harmonization CIOPORA basically meant the same duration, but starting with the filing of the application, with the particular aim of avoiding the previously described drawbacks. That solution would achieve effective provisional protection.

117.2 Mr. Royon also wished to return to a related problem that had already been raised in respect of Article 6, that is to say the problem of time limits for filing the application where a variety had been marketed abroad. In the United States of America, breeders were faced with the risk that marketing, even of a duration less than that provided for in Article 6(1)(b) of the Convention, could constitute disclosure within the meaning of the American plant patent law. It was CIOPORA's wish that all those provisions should be harmonized.

118. Mr. Schlosser said that, in fact, in the United States of America, marketing abroad had no effect on obtaining a patent; it was only marketing in the United States of America that affected the right to receive patent protection. With respect to Mr. Royon's suggestion for harmonizing the terms of protection, Mr. Schlosser asked whether the suggestion would be taken care of if UPOV were to develop a minimum period of protection rather than a harmonized period.

119. Mr. Royon (CIOPORA) said that he had not had the occasion to consult with the members of CIOPORA and could therefore not give a reply.

120. Mr. Slocock (AIPH) said that his organization was interested to see the comments of the other organizations on this Article. AIPH agreed with the view expressed by CIOPORA, and felt that if true harmonization was to be achieved, it would be necessary to be specific rather than to state minima. As AIPH felt that harmonization was so important, it had proposed specific durations of twenty and twenty-five years rather than minima, as provided in the present text of the Convention, the two durations to apply to the two groups of plants distinguished in Article 8.

121. Mr. Clucas (ASSINSEL) said that his organization had thought in terms of a minimum period of twenty years, but would agree with a twenty and a twenty-five year period. ASSINSEL would not object to a period of twenty-five years.

122. Mr. Schlosser said that, as a result of the suggestion, in the systems that relied on patents for the protection of plant varieties, the period for plant varieties might be different and probably longer than the period for other kinds of inventions. Mr. Schlosser asked Mr. Clucas whether he thought that that would create a public policy issue.

123. Mr. Clucas (ASSINSEL) replied that he did not think that it would create a public policy issue.

124. Dr. von Pechmann (AIPPI) stated that the term of protection depended altogether on when it started. The Convention provided that it should be calculated as from the time of grant. However, if protection were to start with the application, there would be justification for extending the term to at least 25 years.

125. Mr. Schlosser said that there seemed to be a consensus developing towards a longer period which should perhaps be twenty-five years.

126. Mr. Petit-Pigeard (COMASSO) stressed that the important items were harmonization of the terms of protection for each species and definition of that term. It was absolutely necessary that harmonization be achieved within

the European Communities. Further, although 20 years was the minimum, it was also obvious that 25 or even 30 or 40 years was a minimum for certain species, particularly the forestry species.

127. Mr. Slocock (AIPH) clarified the AIPH proposal, saying that it was twenty years for the first group of species listed in the present Article 8, and twenty-five years for the second group. Those periods would include the period of provisional protection from the filing date.

Article 9 (Restrictions in the Exercise of Rights Protected)

128. Mr. Schlosser then turned to Article 9 which, he said, dealt with what might be called compulsory licensing for breeders' rights. There had been a suggestion from AIPH that the United Kingdom Act be followed to establish, or require, a compulsory licensing system. The other suggestions received were directed towards the deletion of paragraph (2), since it seemed that the wording of that paragraph could be taken to mean that the only time a breeder or a certificate holder could be adequately remunerated was when a restriction on the exclusive right was made in order to ensure the widespread distribution of the variety. Mr. Schlosser then asked Mr. Slocock to comment on the AIPH proposal for compulsory licensing.

129. Mr. Slocock (AIPH) said that he did not have very much to add. Compulsory licensing seemed to be an appropriate machinery to adopt, in cases such as this, in order to protect the public interest. AIPH had quoted the United Kingdom legislation as a model. It was not directly applicable in its present form, but if the principle was accepted, it would not be hard to draft an additional article along these lines.

130. Mr. Schlosser asked Mr. Slocock whether he would be satisfied as the conclusion of this discussion if reference was simply made to the discussion on Article 5, paragraph (3), taking into account Dr. von Pechmann's suggestion for that paragraph.

131. Mr. Slocock (AIPH) said that, concerning the proposals made by AIPPI, AIPH had real reservations about an interruption in the direct access of a breeder to new genetic material. However, if a dependent right was introduced, AIPH would certainly wish to see that protected by a system such as that proposed.

132. Mr. Williams (AIPPI) said that whether or not compulsory licensing was dealt with in Article 9, any country had the authority to make provisions in that respect in the public interest. It was nevertheless good to express this principle. But the problem raised in connection with Article 9 was different from the one raised in connection with Article 5(3). The proposal relating to that Article implied an automatic compulsory license. Mr. Williams was not convinced that the public interest was, in fact, served by such a compulsory licensing system. The purpose of intellectual property laws was to provide incentives for people to conduct research, but they also provided incentives for other people to invent around, or to breed around, new varieties.

133. Mr. Schlosser agreed with Mr. Williams that there was a distinction between the compulsory licensing system proposed for Article 5(3) and that contemplated in Article 9. Dr. von Pechmann's proposal related to the breeding of new varieties. Article 9, however, related to the exploitation of protected varieties.

134. Mr. Royon (CIOPORA) stated that CIOPORA had not submitted any comments on Article 9 in view of those already made. On various occasions, CIOPORA had firmly opposed the principle of compulsory licensing in respect of ornamental plants. CIOPORA was therefore also opposed to the proposal by AIPH and wished to go along with the written comments of ICC. As regards application of the principle of compulsory licensing in the form of a dependent license, that problem was not one of current interest as regards varieties and could be discussed under the possible implications of protection for the results of biotechnology.

135. Mr. Roberts (ICC) associated the ICC with the comments of the two previous speakers.

136. Mr. Clucas (ASSINSEL) associated ASSINSEL with the comments of COMASSO.

137. Mr. Petit-Pigeard (COMASSO) observed that the right should not be confused with its exercise. The exercise of a right could be limited, but not the right itself since it was intangible.

Article 10 (Nullity and Forfeiture of the Rights Protected)

138. Mr. Schlosser turned to Article 10 and referred to the proposal of AIPH to add language assuring that the lack of homogeneity and stability in a variety would result in the rights being forfeited.

139. Mr. Slocock (AIPH) said that his organization felt that there was a problem relating in particular to mutants that were neither homogeneous nor stable. Therefore, somewhere in the Convention, it should be stated that there were conditions for continuation of protection, and it seemed appropriate that this should be done in Article 10.

140. Mr. Schlosser asked Mr. Slocock whether his concern was dealt with in paragraph (2).

141. Mr. Slocock (AIPH) replied that it was not since paragraph (2) was based on the provision of material. It seemed to AIPH to be helpful to set out that the rights of the breeders would become forfeit if the conditions of homogeneity and stability were no longer met.

142. Mr. Schlosser said that he thought that all agreed with the essence of the proposal. The question was simply whether it actually needed incorporation in the Convention and if so how.

Article 11 (Free Choice of the Member State in Which the First Application is Filed; Application in Other Member States; Independence of Protection in Different Member States)

143. Mr. Schlosser then turned to Article 11, for which there was a suggestion, again by AIPH, that an application for protection in one member State should constitute an application in all of the member States.

144. Mr. Slocock (AIPH) said that from the statement of FIS set out in document IOM/III/3, it appeared that AIPH shared some common ground with the point made by that organization. It seemed that throughout the revision, ways should be sought of encouraging UPOV towards an increased simplification in practice. The AIPH proposal was a move in that direction.

145. Mr. Schlosser said that this was a subject that the Administrative and Legal Committee had considered. It had some practical difficulties of course, but it seemed to be a very realistic goal to aim for. Mr. Schlosser said that his only reservation about the proposal was that it was obviously very complicated, would take a great deal of planning and would apply to very few applications. There was a cost benefit decision to be made in doing something like this.

146. Mr. Slocock (AIPH) commented that AIPH did realise the implications, but felt that it was a goal towards which UPOV should work.

147. Dr. von Pechmann (AIPPI) pointed out that, if Article 11 were to be changed as proposed by AIPH, then Article 12 would no longer be necessary. He wished to utter a warning, since Article 12 provided the possibility of waiting for one year before applying in other States. That possibility should be maintained.

148. Mr. Schlosser said that the second proposal for Article 11 went a step further. It suggested that a system be established so that protection obtained in one State would automatically be extended to other States if the applicant so requested.

149. Mr. Besson (FIS) observed that the proposal had been made within FIS but not by FIS as a whole.

150. Mr. Urselmann (COMASSO) said that it might be advisable to clarify that the first application would not necessarily relate to several countries, with all the costs that that would involve.

151. Mr. Schlosser said that he presumed that it would be possible to devise a system whereby someone who filed an application in his home country would have a year to decide whether he was going to file a single application for other countries. In this way, advantage could be taken of the right of priority.

Article 12 (Right of Priority)

152. Mr. Schlosser then turned to Article 12 where the prevailing suggestion was that the priority period be extended from one year to, perhaps, eighteen months or two years. That was a recommendation of CIOPORA, COMASSO, FIS and ICC.

153. Mr. Whitmore (New Zealand) said that he saw a practical problem here, speaking on behalf of the New Zealand Plant Varieties Office and plant breeders. He explained that in developing plant variety rights procedures, officials had worked in close cooperation with breeders. While for some species New Zealand had official testing, for others descriptions and trial results purchased by breeders were accepted. Among other things, New Zealand breeders had requested that applications for plant variety rights be processed promptly and without undue delay. There was some concern at present that the existing provisions in the UPOV Convention had the potential for slowing down the process because priority claims could create complications over testing, in particular testing for distinctness. Thus, an application might be made for variety A, and trials started to determine distinctness, homogeneity and stability. These trials might have been well under way when application was then made for variety B, for which a priority was claimed that gave B priority over A. The testing for A would probably have to start again as a comparison

with B would not have been part of the original trial, so a season's testing and the associated cost would have been wasted and the finalization of the application for variety A would have been delayed correspondingly. There could be even more of a problem if a breeder was carrying out the testing and had completed his testing over two or three years before applying for rights: if variety B gained priority over A, the breeder of A would have had to start the trials again. Four international organizations had proposed extending the period of priority, and Mr. Whitmore appreciated the reasons why, but any extension of the priority period would have the potential to intensify this particular problem. With the interests of breeders in mind, he pointed out this problem to sound a note of caution.

154. Mr. Urselmann (COMASSO) said that he imagined that it would not be a problem for COMASSO to have the four or six years period starting after one year and not after eighteen months or two years to avoid the problem described by Mr. Whitmore.

155. Dr. von Pechmann (AIPPI) had not altogether understood the statements made by the previous speakers. The test for distinctness concerned only varieties that were a matter of common knowledge at the time of the application for protection or of the priority date. In the case referred to, however,. a variety was concerned that was not a matter of common knowledge, but which was only deemed to have been previously applied for in view of the priority. Thus, there was in fact no need to carry out the test for distinctness between the two varieties A and B. Further, as far as Dr. von Pechmann was aware, in those States that carried out official testing no serious problems had arisen and certainly none that would advocate against extending the period of priority.

156. Mr. Royon (CIOPORA) supported what had been said by Dr. von Pechmann since he could see no additional difficulty that would result from extension of the priority period from one year to two years since the novelty criterion was an absolute, global criterion.

157. M. Whitmore (New Zealand) said that there seemed to be some confusion here: the priority period had an effect upon distinctness whereas the four and six year periods had an effect upon novelty.

158. Mr. Slocock (AIPH) said that his organization did not comment in writing on this particular Article but it did discuss the suggestions contained in document IOM/III/3. AIPH supported the view expressed by FIS that the priority period should be extended to eighteen months, although AIPH hoped that if its recommendation for Article 11 was accepted, much of Article 12 would no longer apply.

159. Mr. Schlosser said that the ICC's suggestion in document IOM/III/3 to lengthen the priority period from one year to either eighteen months or two years was based on the fact that the development of plant varieties was a long, drawn-out process. That was true, Mr. Schlosser said, but the period of priority began, and was measured, from the first filing of the application in one of the member States. The variety was already developed at that date. Therefore, Mr. Schlosser asked how that rationale supported the suggestion for a longer priority period.

160. Mr. Roberts (ICC) said that there was a defect in the logic of the suggestion made by the ICC in document IOM/III/3. The ICC supported an extension of the priority period but the reason given was not fully adequate logically.

161. Mr. Royon (CIOPORA) said that his organization considered all the development of a variety, including the testing of the variety in other countries under other climatic conditions and the marketing tests, and did not only consider the pure breeding phase. This took a long time, and so instead of relying purely on the four or six year period from first marketing in a foreign country which was provided for under Article 6, CIOPORA thought that it was safer to have a two year period of priority to be sure that all the testing could be done prior to deciding on the worldwide marketing of the variety. CIOPORA was in favor of having a two year period rather than an eighteen month period because of seasonal considerations which went from year to year.

Article 13 (Variety Denomination)

162. Mr. Schlosser turned to Article 13. None of the international organizations had suggested deleting the Article, but FIS had mentioned the need for a complete revision in the light of commercial realities. AIPH had pointed out the need to ensure that distinctions were being preserved between trademarks and variety denominations. There were some suggestions for the deletion of the sentence precluding denominations consisting solely of figures and for the cancellation or substantial revision, as a matter of priority, of the Recommendations on Variety Denominations. Mr. Schlosser said that he wished to postpone discussion of this last point until document IOM/III/4 was discussed. He then asked for comments on Article 13, paragraph (1).

163. Mr. Royon (CIOPORA) wished to first raise a matter that was a question of semantics. CIOPORA felt that it would be useful to change the term "denomination" which immediately led one to think of a name, since CIOPORA was also asking that combinations of letters and of figures, or even combinations of figures, could be adopted as denominations. That is why it appeared to CIOPORA that the term "designation" would be better and that "variety reference" would be even better.

164. Mr. Brandenburg (International Commission for the Nomenclature of Cultivated Plants - ICNCP) did not think that deleting the prohibition on denominations consisting solely of figures would be appropriate for the Convention. If there was only a code system, a rigid system would be built up which could not evolve in itself. Varieties not protected by plant breeders' rights would normally have denominations according to the International Code of Nomenclature for Cultivated Plants. To have a good uniform world system for the denomination of varieties, Mr. Brandenburg said that it would be wise to conform the Convention to the principles of the Code. Deleting the prohibition on denominations consisting solely of figures would introduce a major difference.

165. Dr. von Pechmann (AIPPI) wished to return to the first sentence of Article 13(1). The term "generic designation" had led to difficulties on occasion where trademark protection had been applied for in respect of the variety denomination of a variety which could not enjoy variety protection in the State concerned since, for example, that State was not a member of UPOV or had not instituted a possibility of protection for new varieties of the species involved. Such trademark protection had often been refused on the grounds that the denomination constituted a generic designation that was not eligible for protection as a trademark. The legislation of the Federal Republic of Germany did not qualify variety denominations in that way and the the term "variety denomination" was in no way restricted thereby. Dr. von Pechmann therefore asked that consideration be given to the possibility of dropping the term "generic designation."

166. Mr. Schlosser thought that the first sentence of the paragraph did not establish or prescribe a rule of law, but merely stated what the rule of law was in most countries. Furthermore, it did not state that the variety denomination would become generic in all countries, but only in the country in which it was registered as the denomination of a protected variety.

167. Dr. von Pechmann (AIPPI) explained that, for example, a variety denomination registered in the Federal Republic of Germany could not be asserted there as a trademark. That was right and proper. However, in other States there had already been opposition in general--and not limited to the Federal Republic of Germany--to the registration of a trademark on the grounds of it constituting a generic designation in general with reference to Article 13. It was therefore desirable that Article 13(1) be amended.

168. Mr. Schlosser said that if Dr. von Pechmann's suggestion were to be followed, the denomination might become generic in a country where it was used, regardless of what Article 13 said. Thus, deleting that provision might not resolve his concern.

169. Mr. Royon (CIOPORA) said that his organization totally disagreed with what had been said earlier about the International Code of Nomenclature. There had been ample opportunities in the past to cover that subject, notably during the symposium of UPOV on nomenclature. CIOPORA's code now represented more than 95% of all ornamental and fruit tree varieties protected in the world, and none of CIOPORA's breeders paid attention to the International Code of Nomenclature. Mr. Royon said that the Code met perhaps the concerns of botanists but was not in keeping with the modern requirements of commerce in plants. Furthermore, when the Code said that each distinct variety should be identified by a fancy name, then the aims of the Code for uniformity, accuracy and fixity were completely defeated.

170. Mr. Brock-Nannestad (AIPPI) said that once a trademark became generic, no more rights attached to it and the use of the denomination became free in connection with a variety. Mr. Brock-Nannestad asked whether the reference in Article 13 to the variety denomination becoming generic meant "generic" in the trademark sense of the word.

171. Mr. Schlosser replied that the reference to "generic" was in the trademark sense of the word, but it was the variety denomination that was generic, and not a trademark.

172. Mr. Brock-Nannestad (AIPPI) said that this reply raised the question of the relevance of the second sentence of Article 13(1): if a denomination was generic, it could in any case be used by anybody and no rights in the designation registered as the denomination of the variety should hamper the free use of the denomination.

173. Mr. Clucas (ASSINSEL) said that his organization had made its views known on this particular subject often before. ASSINSEL supported the submission made by COMASSO, bearing in mind that one had to be guided by the practicalities and realities of the commercial world.

174. Mr. Slocock (AIPH) wondered why, on account of the practicalities and realities of the commercial world, one would have to accept that a denomination might consist solely of figures. AIPH saw an ever increasing subordination of the authority of the variety denomination to what might be called "the privilege of the trademark." Mr. Slocock said that amendment of Article 13(2) to allow such denominations would increase that privilege, which was unacceptable for AIPH.

175. Mr. Schlosser said, in reply to Mr. Slocock and Mr. Brandenburg, that the present rule allowed the acceptance of denominations consisting solely of figures when they represented the established practice. Thus, the rule was not as categorical as they might have judged it.

176. Mr. Slocock (AIPH) replied that if the second sentence of Article 13(2) were to be deleted, the effect would be to abandon any limitation on the use of figures. This seemed to him to be an undesirable trend which he did not want to encourage.

177. Mr. Clucas (ASSINSEL) noted what Mr. Slocock had said but added that there was a tradition which had become very well established in the professional circles, and there seemed to be no reason to reverse it. Within a professional environment, everybody understood the system, which had worked for many years. It had not extended into areas where it could in any way impinge upon the satisfactory trading in varieties.

178. Mr. Schlosser noted that there were no further comments on paragraph (2) of Article 13 and moved to the proposal made by the International Commission for the Nomenclature of Cultivated Plants which called for the replacement throughout the Convention of the term "genus or species" by the term "taxon." He called upon Mr. Brandenburg to comment on the proposal.

179. Mr. Brandenburg (ICNCP) said that in many cases the taxonomical units which where referred to with the phrase "genus or species" were not units of those ranks. It would complicate the Convention if all the nomenclatural units were used throughout the Convention. Therefore, Mr. Brandenburg said, it was suggested to replace the words "genus or species" by "taxon," which provided the necessary flexibility.

180. Mr. Schlosser assured that the proposal described by Mr. Brandenburg would be considered when the Convention was revised.

181. Mr. Slocock (AIPH) hoped UPOV would take note of the AIPH proposal set out in document IOM/III/3 for a further paragraph for Article 13.

182. Mr. Schlosser said that the Article 13(9) proposed by AIPH would read: "Under no circumstances shall the use of trademarks confer rights to the breeders over or above those rights provided under the terms of the Convention." He said that the proposal seemed to abrogate trademark rights.

183. Mr. Slocock (AIPH) replied that the idea was to define as far as possible the areas of authority conferred by the various rights. He suggested that UPOV could be able to prepare a more suitable form of words.

184. Mr. Royon (CIOPORA) said that his organization was very adamantly opposed to the proposal made by AIPH since it was of the view that it was precisely the purpose of trademark legislation to confer rights to trademark owners which had nothing to do with the rights under the UPOV Convention.

185. Mr. Roberts (ICC) said that his organization supported CIOPORA's position.

POSSIBLE CONSEQUENCES OF BIOTECHNOLOGY IN THE FIELD OF INTELLECTUAL PROPERTY PROTECTION

Introduction

186. Mr. Schlosser introduced document IOM/III/2. He said that this document had been originally produced by the Biotechnology Subgroup of the Administrative and Legal Committee. It had been presented to the Administrative and Legal Committee and approved for use at the present meeting. However, the UPOV member States regarded it as a discussion paper which should not necessarily be taken to represent views of any government on any particular subject. The document concerned very weighty matters such as what subject matter should be covered by the UPOV Convention, the scope of genetic engineering patents and patents for genes, and the resolution of conflicts and overlaps between patents and plant breeders' rights. The document raised a number of questions and provided tentative answers to those questions. Mr. Schlosser said that he would go through the questions in approximately the order in which they appeared in the document.

Protection of Animals and Microorganisms

187. The first question presented, Mr. Schlosser said, was whether the Convention should provide protection for animals and microorganisms, or at least an option for protecting them. It was pointed out in the document that the patent laws made very few, if any, exceptions to patentable subject matter. The objective of the patent laws was to protect as much subject matter as possible. Following that precedent, one would come to the logical question of whether the UPOV Convention should provide for the protection of as much subject matter as possible, including microorganisms and animals. Mr. Schlosser asked the international organizations whether they had any views on that question, taking first the question of the protection of animals.

188. Mr. Royon (CIOPORA), making a general statement on document IOM/III/2, said that recently the subject of the protection of the results of biotechnology had raised a number of problems, and because of the various decisions made in some countries, in particular in the United States of America, the question had arisen of whether patents should be a valid alternative for the protection of living matter broadly conceived. CIOPORA was prepared to support the UPOV system for plant varieties provided that the criticisms that it had voiced over the years were taken into consideration. CIOPORA was of the view that the UPOV Convention was a workable instrument, provided the rights were raised to such a level as to make it competitive with the patent system. CIOPORA was somewhat concerned at the suggestion in document IOM/III/2 that the UPOV system should perhaps be extended to all living matter, including animals, since it was felt very strongly that the primary aim of UPOV was to cover what it covered now, and to do it well. CIOPORA was of the view that the present text of the Convention was judged by many parties to be unsatisfactory in its scope of protection, so that before contemplating protecting results of biotechnological plant breeding, the Convention should first be revised to grant adequate protection to plant varieties as such.

189. Mr. Schlosser replied to Mr. Royon that document IOM/III/2 did not represent any commitment on UPOV's part to protect animals and microorganisms. It was merely a discussion paper to raise the issues.

190. Mr. Winter (COMASSO) stated that COMASSO had debated the question whether UPOV should introduce the possibility of protection for microorganisms, at least as an option, and had come to the majority conclusion--based on the same

considerations that had been presented by Mr. Royon--that it would generate unnecessary new conflicts with patent law. As far as the breeding of animals was concerned, COMASSO did not consider itself competent.

191. Dr. von Pechmann (AIPPI) stated that AIPPI considered patent law to be the appropriate system for protecting microorganisms and the associated inventions. AIPPI had also discussed whether higher organisms could also enjoy patent protection in the same way, but had not come to a final conclusion. The European Patent Convention excluded animals from protection. The Convention spoke of animal species in German, but of course meant animal breeds. Personally, Dr. von Pechmann felt that protection for animal breeds could probably be quicker to achieve through a change in the UPOV system since amendments to the European Patent Convention were extremely difficult by reason of the requirement for unanimity. However, the main question was whether protection under the UPOV Convention could be improved for those concerned and thereby its attractiveness also increased for animal breeders. At present, Dr. von Pechmann had the feeling that it was not yet possible to advocate the inclusion of animal breeds within the UPOV system.

192.1 Mr. Clucas (ASSINSEL) said that his organization was looking for progress towards improving and strengthening the Convention as regards plant varieties. It was the view of many members of ASSINSEL that the patenting of biotechnology within the context of plant genetic improvement was a separate issue and should be treated quite separately, but that there should be an interface between patent protection and plant variety protection.

192.2 Mr. Clucas further stated that ASSINSEL was confused by the reference to animals in document IOM/III/2. ASSINSEL was not competent to comment on biotechnology within the animal kingdom, and Mr. Clucas wondered whether there were people present who were.

193. Mr. Schlosser explained that the drafters of the paper wanted to make it as expansive as possible to include as many reasonable possibilities as could be included, and obviously animal breeding was one very important aspect of biotechnology which should not be overlooked. If UPOV was to pursue the question of protection in the field of animal breeding, it would be necessary to invite experts who were competent to give advice on animal biotechnology.

194. Mr. Roberts (ICC) said that document IOM/III/2 was a very interesting discussion paper which was an example of the openness of UPOV to ideas. However, the ICC had not yet had the opportunity to consider the extension of UPOV type protection to either animals or microorganisms and therefore could not comment in detail. Nevertheless, these were interesting ideas which should not be ruled out out of hand. The ICC's position on patents and plant variety protection was that it was a strong supporter of both, and it did not wish to rule out an extension of the plant variety protection system into animals and perhaps microorganisms.

195. Mr. Slocock (AIPH) pointed out that if the meeting certainly was not competent to deal with protection in the field of animals, discussions on the principles of the Convention inevitably extended also to that field. He felt that the meeting should not embark on that field and urged that UPOV should not embark on it at this stage. However, in political circles and elsewhere, it was sometimes very difficult not to take into consideration the implications outside the plant kingdom. AIPH urged UPOV to concentrate on adapting the Convention to take into account technical and biotechnological changes.

196. Mr. Kunhardt (Federal Republic of Germany) wished to point to the structure of the document. The introduction contained thoughts on the protection of microorganisms and animals, but that did not mean they were to be made the subject matter of the UPOV Convention. The focus of the document was placed on the improvement of the current UPOV Convention. It had been perfectly clear to the authors of the document that no definitive statements could be made without possibly entering into conflict with the patent law of various States and also with the interests of organizations and States not represented at the meeting. It had therefore been obvious that emphasis would have to be placed on improvement of the UPOV Convention as regards the protection of new plant varieties. However, should that result in a structure that might appear to one or the other of the member States as a suitable one for applying the principles of the UPOV Convention at national level to other living matter, such as microorganisms or animals, then they should not be prevented from so doing. The matter for discussion went no further than that. Indeed, no obligation had been submitted for debate.

197. Dr. Gfeller (Vice-Secretary General) pointed out in that context that animal breeds were already eligible for protection in Hungary. He further wished to read out a telegram received by the Office of the Union from Mr. A.D. Thelwall:

> "Reference: This note is from a consortium of United Kingdom animal biotechnology breeding companies coordinated by A.D. Thelwall of Prospect Management Services, Yorkshire, United Kingdom.
>
> "Response:
> "1. We have read [document IOM/III/2]. We are in fundamental disagreement with almost all your conclusions/proposals regarding the changes which are required due to the consequences of biotechnology.
>
> "2. But more particularly the paper refers to animals. It is understood that no organizations with [...] interests [in animal breeding] have been consulted in the preparation of the paper, nor have any such organizations been invited to your meeting. Accordingly we ask that all consideration of [protection in the field of] animals by UPOV ceases forthwith until such time as proper representation of [relevant] interests is effected.
>
> "3. We consider that it is vital for animal genes and associated technology/construction to be capable of patent protection. Without this protection the rapid, commercial exploitation of the technology will not take place.
>
> [...]"

198. Mr. Schlosser said that the conclusion seemed to be that the Convention should not provide either the opportunity or the obligation for the protection of animals and/or microorganisms under national laws of the member States.

Protection above variety level

199. Mr. Schlosser then turned to the next subject in document IOM/III/2 which concerned protection not only for varieties but also for higher orders, that is, for genera and species of plants. The document pointed out that if protection were available, there would be the possibility of confusing the

scope of legal rights in varieties and also hampering breeding activities. So the document drew a tentative conclusion that plants above the variety level should not be protected under the Convention.

200. Mr. Williams (AIPPI) said that it seemed to his organization that a restriction against protection of plants on the species level or any other level above the variety level would be an incursion into the patent laws. For example, a newly invented component, a gene, could be inserted into a species, which would give it a particular characteristic. To prohibit protection at the said level would mean that there would be no protection in practice for that particular invention. The only possible advantage of this would be that it may avoid collision between rights, but such a collision would not be unusual. Mr. Williams was of the view that the investment on research and development to produce an invention would not be adequately protected by a plant variety protection certificate, since it was not known what the range of equivalence would be for the certificate, if there was one at all. Therefore, Mr. Williams urged government delegations to consider providing protection above the variety level.

201. Mr. Schlosser replied that it was true that if protection were available above the variety level, there would be a clash with patent rights, but that even if protection were left at the variety level, there would still be such a clash. He asked whether Mr. Williams would have the same view about protection above the variety level if there was a resolution of the clash between patents and plant breeders' rights.

202. Mr. Williams (AIPPI) replied that his answer depended on what the resolution was. He did not think that a compulsory license would be a satisfactory resolution. The appropriate resolution would be one that occurred naturally by negotiation.

203. Mr. Kunhardt (Federal Republic of Germany) stated that a vital element of plant variety protection was being discussed, that was to say a system of law that in various respects, and particularly in that one, differed from patent law. Up to then, it had always been looked upon as a particular advantage that plant varieties could already be protected if their specificity compared with other plant varieties consisted in the fact that characteristics that were known and already existed were combined in a new way. In other words, eligibility for protection derived from the continual regrouping of characteristics within a species. In view of the possibilities for breeding and for the normal exploitation of varieties, it had so far been considered the optimum form of protection for living matter. To make individual characteristics subject to isolated protection would restrict that principle. Those characteristics could then no longer be involved in the free recombination of characteristics that led to new eligible varieties. It would therefore have to be decided whether the current principle was to be maintained or amended or whether it was wished to protect an inventive idea exclusively under the principle of patent law. In that latter case, one would have to realize clearly that if a characteristic or if a whole plant species were to be occupied by the principle of protection of an inventive idea, that would impair the principle of protection for the recombination of properties. It was not possible to have both at the same time. That raised a question for the professional bodies: did they wish to continue to have protection for varieties as groups of living individuals or did they simply wish, in this field also, to have protection for an inventive idea?

204. Mr. Roberts (ICC) said that his organization supported the proposals of the discussion paper: the ICC was of the view that patents were better adapted for protecting new genera, just as, in general, plant variety rights were

better for protecting new plant varieties. The UPOV system had been worked out in terms of plant varieties, and the ICC foresaw possible difficulties if the arrangement was extended upwards.

205. Dr. Lange (ASSINSEL) asked Mr. Kunhardt whether his words were simply limited to the UPOV Convention, i.e., whether the UPOV system should remain true to itself and not, for instance, afford protection also for characteristics or for genera, species or other higher divisions. Mr. Kunhardt gave a positive reply with which Dr. Lange was in agreement. However, Dr. Lange wished to support Mr. Roberts to the extent that protection of such characteristics through patent law should be possible.

206. Mr. Slocock (AIPH) said that his organization took the view that it was plant varieties which should be the subject of protection. Protection above the variety level was tantamount to protection for characteristics embodied into plants. AIPH would strongly resist the possibility of the Convention applying to characteristics as such. There were participants in this meeting who felt that protection should be granted for subject matter of the kind in question under the patent laws. Mr. Slocock presumed that discussions would turn to this at a later stage.

207. Mr. Winter (COMASSO) stated that COMASSO was also of the opinion that an extension of the subject matter of protection to plant divisions above varieties, characterized by features or combinations of features, could not be deemed desirable if it were to restrict progress in breeding. Nevertheless, one would have to consider the question whether protection in accordance with the principles of the UPOV Convention in respect of such subject matter would in fact restrict progress if it were designed in the same way as the present protection, i.e., with a "breeding exemption." Mr. Winter would like to hear a discussion on that matter.

208. Dr. von Pechmann (AIPPI) had some words to say about the restrictive effect on progress exerted by protective rights. His point of view was just the opposite, namely that protection rights promoted progress. In his view there was no actual example of rights that restricted progress. In many newly-opened fields the initial inventions were protected and were nevertheless covered by an avalanche of subsequent inventions that had furthered the whole technology by means of additional rights. A protective right created a prohibition, thereby obliging competitors to look for new ways of getting around the right or to take a license and to develop the technology further.

209. Mr. Williams (AIPPI) thanked Mr. Kunhardt for clarifying the subject of the discussion. He said that his earlier comments had overlapped into the patent area, which would presumably be dealt with later, and that AIPPI would not press for protection above the variety level in the UPOV Convention.

210. Dr. Lange (ASSINSEL) wished to make it quite clear again that ASSINSEL supported the view that nothing but plant varieties should be the subject matter of protection under the UPOV Convention.

211. Mr. Le Buanec (ASSINSEL) pointed out that ASSINSEL had not examined in detail the problems under discussion and that its members therefore expressed individual opinions rather than general opinions. He had the impression that the discussions concerned two separate matters at the same time and that there was some degree of confusion. The first question was whether, in a general manner, it was wished or not to have protection at a level above that of a variety. If the reply were in the negative, because it was felt that it would be detrimental to the development of the variety system, then it would have to

be made sure that the possibility was not available, not only through the system of protection deriving from UPOV but also under patents. If the reply were to be positive, because protection at a higher level was not detrimental to genetic progress, one could well ask, since the UPOV Convention gave satisfaction to the profession for the protection of varieties, why that protection afforded by the UPOV Convention should not be extended to the higher level.

212. Mr. Royon (CIOPORA) again emphasized that, in the opinion of CIOPORA, UPOV should restrict itself for the moment to the matter of protecting varieties, a field for which it had been conceived and established and for which it needed to be revised as a function of the desiderata expressed by the various bodies present at the meeting. As far as a level higher than that of varieties was concerned, CIOPORA felt that protection was necessary and that it was already provided by the patent system. It was therefore pointless for the moment, and in any event premature, to wish to extend the UPOV Convention in that field in view of the existing conflicts. It was generally very difficult to make comments on document IOM/III/2 since the whole approach of the document appeared to be based on an essential fear on the part of certain UPOV representatives that the UPOV system might be attacked and reduced by the all-powerful patent. On the contrary, CIOPORA held that UPOV had a part to play, but that it had to play it well, in its own field, with a perfected and doubtlessly greatly improved system.

213. Mr. Smolders (ICC) said that patents and plant variety protection were two essentially different systems of protection based on entirely different basic concepts and were not alternatives. If one introduced generic protection into the plant variety protection system, questions of dependency of protection would arise, and then it would be necessary to amend the plant variety protection laws and the UPOV Convention in the direction of patent protection.

214. Mr. Schlosser said that the conclusion to be drawn here, from the statements of the international organizations, was that UPOV should concentrate on protecting varieties and should not embark on the protection of higher forms, e.g., genera and species.

Requirements for Granting Protection

215. Mr. Schlosser introduced the next item entitled "Requirements for Granting Protection" and said that he did not intend to have a discussion of this subject since it had been dealt with earlier in connection with the revision of the Convention.

Scope of Protection

216. Mr. Schlosser then turned to item 4 entitled "Scope of Protection." He said that it raised issues which had already been discussed but also identified certain exceptions to the plant breeder's right. Mr. Schlosser said that he wished to begin with discussion of the most controversial exception, namely, the "farmer's privilege."

217. Mr. Williams (AIPPI) asked what the difference was between the "private, non-commercial use" and the "multiplication on one's own premises" ("farmer's privilege").

218. Mr Kunhardt (Federal Republic of Germany) replied that the terms were listed cumulatively in order to clarify that question of doubt. Multiplication

on one's own premises for the production of the final product was indeed considered not to be private use in many countries and thus constituted commercial use since the farmer was carrying out the multiplication professionally. It was of course a quite different case when a housewife sowed a few seeds in her garden in order to enjoy the flowers.

219. Mr. Williams (AIPPI) said that Mr. Kunhardt's statement answered his question but it also raised another question, which was whether growing flowers also included growing tomatoes and other vegetables for the housewife. The question was whether a distinction should be made between ornamental and agricultural plants.

220. Mr. Schlosser said that according to his understanding, no distinction was to be made. He then asked for further views on the "farmer's privilege."

221. Mr. Petit-Pigeard (COMASSO) said that the point in question was whether a privilege was being defined or a limitation on breeders' rights. There existed national laws that set out a farmer's privilege; that was the case, in particular, of the Plant Variety Protection Law of the United States of America that described most precisely the rights of the farmer both as regards production and also trade in that production. There were other countries, particularly European countries, where that "privilege" was simply a word that was not used in any text nor codified by any law or adopted by any custom. "Farmer's privilege" could be conceived as the perpetuation of a custom of holding back a part of the harvest in order to sow the following harvest. However, the protection which was of recent date as far as the varieties were concerned could well prevail over that custom since the latter concerned varieties that were not protected, and for a good reason! Today, there was a tendency to believe that because farmers had produced their seed themselves for centuries, they had a right or a "privilege," on their own holdings and using harvest grains or seed bought regularly, to be the producers of seed, to re-sow their acreage under crop and to sell the production. By putting the "privilege" or custom in its correct context, one could possibly maintain that a farmer produced seed for the products consumed within his household. But, once one considered that a farmer, a group of farmers or a union of cooperatives had the "privilege" of producing seed outside protection and the administrative circuits of certification and control, that led in a considerable reduction in the breeders' rights.

222. Mr. Schlosser thought that Mr. Petit-Pigeard's statement reached the core of the "farmer's privilege" problem. It was a question of whether businessmen masquerading as farmers should be allowed to reproduce protected seed and sell it in competition with the original breeder, whether there should be some limitation in the Convention on such activities. Mr. Schlosser said that the "farmer's privilege" was often used as a guise for competing with the original breeder.

223. Mr. Williams (AIPPI) agreed with the previous speaker's characterization of the "farmer's privilege" problem. However, in the United States of America, the exemption was far from being clear. He suggested that the Convention clarify the limits of the practice that had occurred for years and was causing considerable difficulties.

224. Dr. von Pechmann (AIPPI) said that the term "farmer's privilege" had an undesirable secondary meaning. These days, privileges should generally be done away with: no profession should enjoy a special status. In the case in point, farmers were given the possibility of purchasing a relatively small amount of seed, for which they paid the breeder corresponding remuneration for

his breeding work, but then exploited that seed commercially in a way that Dr. von Pechmann held unjustified in respect of the breeder. However, it was obvious that the "privilege" would be difficult to remove for political reasons. One had, nevertheless, to be quite clear that it was a principle that conflicted with the system of protection, including that of UPOV.

225. Mr. McNeil (ASSINSEL) supported Dr. von Pechmann's statement and said that when the Convention was drawn up, it was probably not thought that the "farmer's privilege" would affect the sales of certified seed. In the last twenty years, in cereals, oil seed rape and pea, companies operating mobile seed cleaners had entered farms to process farmers' own seed. ASSINSEL was of the view that this processing was part of the production process over which the breeder should have an exclusive right. However, Article 5 of the UPOV Convention required authorization for the production for the purposes of commercial marketing, and the word "marketing" restricted the breeder from taking any action against mobile seed cleaners. Mr. McNeil suggested that the phrase in question be amended to read "for the purposes of commercial use."

226. Mr. Schlosser thought that the point made by Mr. McNeil had been covered in the discussion of Article 5. CIOPORA and a number of other organizations had proposed having stronger rights under Article 5 which would go a great distance in alleviating the problem of the "farmer's privilege."

227.1 Mr. Royon (CIOPORA) pointed out that what CIOPORA wished for was an overall improvement in the definition of the breeders' rights beyond the framework of the "farmer's privilege," which raised a problem above all in the field of agricultural crops. Nevertheless, for the record, the breeders of ornamental plants had suffered directly in Spain from the provision anchoring that privilege although it was not intended for ornamental plants: the producers of cut roses, particularly in the Canaries, made use of that provision, quite justifiably in the view of Mr. Royon, to purchase a number of rose-trees, propagate them on their holdings and sell the cut flowers. One may well ask how UPOV came to accept Article 5 of the Spanish law at the time Spain applied for accession considering that, as far as ornamental plants were concerned, it was fundamentally contrary to the third sentence of Article 5(1) of the Convention.

227.2 Mr. Royon added that CIOPORA supported what had been said by Mr. Williams and thought that the problem of "farmer's privilege," from which certain breeders suffered enormously, had to be resolved in any event.

227.3 Finally, Mr. Royon wished to raise the problem of commercial exploitation in opposition to exploitation for private purposes. In respect of ornamental plants, for example, municipalities or factories carried out propagation for the purpose of planting. In the opinion of CIOPORA, that constituted a commercial or pseudo-commercial use of the variety, and in any event a use that would have to be subjected to the breeder's authorization: every use that procured a financial or commercial advantage should be subject to the breeder's right. Patent case law provided significant examples in that respect and could serve as a source of inspiration. To resume and to conclude, the definition of the breeder's right should exceed considerably the narrow framework that had been defined in 1961 and confirmed in 1978.

228. Mr. Elena (Spain) said that it was neither the place nor the time to raise the question of conformity of a national law with the UPOV Convention. Spain had been a member of UPOV for many years and the decision of the UPOV Council authorizing accession by Spain had been clear and without reservation. As far as Mr. Elena was aware, no petition had ever been submitted to a Spanish court to clarify the scope of the provision referred to. However, a revised

draft law which took into account the views of the interested circles was currently under preparation. That problem would also be taken into account in the draft.

229. Mr. Slocock (AIPH) said that it seemed that much of the criticism of the "farmer's privilege" centered on its abuse rather than on the privilege itself. Although horticultural growers were apparently not able to rely on the "farmer's privilege" to the same extent as farmers, resulting in AIPH having no particular interest in the matter, AIPH was as vigorously opposed to abuses of the Convention and its principles as other organizations. However, AIPH would not advocate global revision of Article 5 on the basis of reported abuses.

230. Mr. Royon (CIOPORA) referred to his previous explanations in reply to the statement by Mr. Slocock. As far as the situation in Spain was concerned and in reply to Mr. Elena, he pointed out that, following consultation with a number of highly competent lawyers, the breeders had decided to forgo court action for as long as the law remained unamended. He was therefore grateful to the Spanish authorities for having deleted the disputed paragraph from the draft revised law.

231. Mr. Roberts (ICC) said that his organization supported the solution of these problems by a general recasting of Article 5 along the lines proposed by the ICC or CIOPORA. In that general recasting, the ICC hoped to see retained exemptions for private and non-commercial use and for research, and felt that the exemptions for commercialization of material of derived varieties and for the multiplication on one's own premises should not necessarily be maintained.

232. Dr. von Pechmann (AIPPI) pointed out that the proposal he had submitted in connection with the discussion on revision of the Convention proposed that the exemption for research and breeding should remain; however, the exception in respect of the marketing of material of a derived variety should be limited insofar as remuneration should be due to the original breeder.

Interaction Between Different Kinds of Protection

233. Mr. Schlosser said that it would not be necessary to discuss the next two items of document IOM/III/2, namely duration of protection, and reciprocity and national treatment, since these had been discussed earlier. He then turned to item 7 entitled "Interaction Between Different Kinds of Protection." He said that the problem here was fairly clear, but the solution was far from clear. The question was how to avoid overlaps between patent rights and plant breeders' rights. Mr. Schlosser described what was said in Item 7 of the paper. He added that there was a possibility, not mentioned in the paper, that overlaps could be tolerated in some way. He concluded by saying that this was a very complicated subject on which the advice of the international organizations was sought. However, before calling on them, he asked whether the UPOV member States wished to comment.

234.1 Mr. Kunhardt (Federal Republic of Germany) stated that the need to consider this matter derived from the differing principles underlying patent law and plant variety protection law. In particular, patent law permitted claims to be freely formulated which then, if accepted by the Patent Office, determined the scope of protection. Under plant variety protection law, on the other hand, a variety was protected as applied for, without claims. It was conceivable--as experience had shown--for patent claims to be formulated in such a way that they covered a multiplicity of varieties, individual varieties or all varieties of a species. It was therefore possible for a patent to

impair the effect of plant breeders' rights, either in part or in whole. It would therefore seem necessary to examine the implications that a granted patent could have for the exercise of rights afforded under the UPOV Convention.

234.2 It was, however, quite clear that no provisions in respect of patents could be entered into the Convention, but only those in respect of plant breeders' rights. The question of overlapping between patents and variety protection did not therefore concern the formulation of the patent law, but the determination of the effect of plant variety protection law, whereby it was possible to regulate, at most, to what extent rights deriving from a patent could be asserted in respect of the exercise of plant breeders' rights under the Convention.

235. Dr. von Pechmann (AIPPI) wished to point to the interaction between genotype and phenotype. In his view, a gene had to be expressed in a plant for that plant to be subject to the protection afforded for the gene.

236. Mr. Besson (ASSINSEL) pointed out that, at the third session of the WIPO Committee of Experts on Biotechnological Inventions and Industrial Property, held from June 29 to July 3, 1987, the national delegations, supported by ASSINSEL, pressed for contacts to be sought between WIPO and UPOV to examine matters of overlapping. Mr. Besson asked whether those contacts had been established and with what outcome.

237. Dr. Gfeller (Vice-Secretary General) stated that the Offices of UPOV and WIPO were prepared to issue a joint convocation to the next meeting of that Committee. UPOV was soon to make a corresponding request to the Consultative Committee.

238. Mr. Roberts (ICC) said that the ICC was of the view that there was no problem in the overlap between patents and plant breeders' rights. There were frequently overlaps between other intellectual property rights of different scopes and bearings such as patent rights, design rights and trademarks, and this was seen, not as a theoretical problem, but only as a practical one. The ICC took the view that there was no problem in the coexistence of patent rights and plant breeders' rights. On occasions, there might be problems for a particular holder of a plant breeder's right covered by a dominating patent, or for the holder of a patent who wished to exploit it in the form of a particular plant breeder's right, but these could be sorted out by the normal process of negotiation.

239. Mr. Royon (CIOPORA) wished to support what had been said by Mr. Roberts. He also considered that those matters should be debated within the WIPO Committee of Experts, in which representatives of UPOV should participate as previously suggested by Mr. Besson.

240. Mr. Slocock (AIPH) said that although some delegations might take the view that it was satisfactory to have an overlap between the two systems with the result that any problems would be solved by the natural progression of law, this situation would not be acceptable to AIPH. He said that it was entirely proper and perhaps overdue that a discussion on this particular subject take place within UPOV. UPOV should determine a policy rather than leaving the resolution of problems to ad hoc litigation. AIPH wished that a precise interface be established. When genetic material was embodied in a plant, in AIPH's view it was axiomatic that plant variety protection should take over from the patent system. Finally, Mr. Slocock said that there might be some who would not like to see UPOV attempt to make suggestions in a field

for which it was not responsible, but in the plant variety protection area of the interface, UPOV had a heavy responsibility and its position should be made clear.

241.1 Dr. Lange (ASSINSEL) was of the opinion that, where the present statutory provisions of the national plant variety protection laws based on the UPOV Convention and of the national patent laws were clearly interpreted, the resultant overlapping was fairly infrequent. However, care had to be taken that varieties were not taken over by patent law. The exclusion of plant varieties from patentability, as stipulated in Article 53(b) of the European Patent Convention, was justified and one could not simply draw upon other possibilities of duplication that existed in industrial property. A special tailor-made system of protection had been established for plant varieties and its principles would be undermined if a completely different system of protection, such as patent law, were to be applied to plant varieties.

241.2 Dr. Lange further held that amendments to one or the other of the legislations were not justifiable for as long as no clear case law was available. The discussion continued extensively to concern hypothetical questions that had been decided by the patent offices only in some cases, but not yet at all subjected to the decision of the courts. Naturally, that situation was unsatisfactory for the inventors of biotechnological processes and products that were capable of patent protection. An effort had therefore to be made to find practical solutions in parallel to the statutory provisions. One could conceive of straightforward contractual solutions or the establishment of pools as was not unknown in respect of copyright. Whether or not that could be placed on a statutory footing was called into doubt by Dr. Lange in view of the fact that case law was lacking or inconclusive.

242.1 Mr. Le Buanec (ASSINSEL) held that breeders had generally everything to gain from a strengthening of breeders' rights within the framework of the UPOV Convention, in respect of plant varieties. He was unable to share the view expressed by the representative of ICC that the present two systems of protection should be maintained since they corresponded to well-defined entities: the UPOV system for varieties and patents for the rest. The opinion of Mr. Le Buanec was that that point of view would be valid if no amendment to patent law were envisaged. However, everyone was aware that work was under way, particularly at WIPO, to determine whether amendments should be made to patent law in order to extend it to varieties, for example by removing the principle of exhaustion of rights. There was therefore a contradiction between the statement that the systems of protection worked well for their own subject matter and in their own respective fields and the ongoing discussions. If it was wished to improve one of the systems, then there was no reason to oppose an improvement to the other system.

242.2 In respect of the question of overlapping, more particularly, Mr. Le Buanec went along with Dr. Lange as regards the theoretical nature of the discussion: technical achievements were as yet rare and of little significance. It was of course possible to carry out simulations and, for example, ask experts what would happen if one inserted a patented gene into a plant or if one patented a process and extended it to the plant. However, it had to be realized that one was dealing with hypotheses and that it would appear extremely difficult to try to amend law on the basis of hypotheses.

243. Mr. Williams (AIPPI) said that AIPPI fully supported the proposition that there could be a coexistence of plant breeders' rights law and patent law, providing alternative forms of protection. There was a decision of the European Patent Office that indicated that plants above the variety level were

patentable under the European Patent Convention (the CIBA-GEIGY case) and a Swiss directive in line with that decision. Mr. Williams said that this indicated that the system in Europe was not very different from that in the United States of America. Mr. Williams asked the national delegations whether the European Patent Office decision was being discussed in their countries, and if so, what were the issues that it raised.

244. Mr. Harvey (United Kingdom) said that his understanding was that the decision referred to by Mr. Williams concerned plant material and not varieties. As to the question of overlap, M. Harvey agreed with those who said that there was no overlap. The question was more one of demarcation between the fields of application of both systems and, in that respect, Mr. Harvey did not believe that this could be left simply to litigation. He welcomed the Vice Secretary-General's statement that a joint UPOV/WIPO meeting would be held, because it was necessary to determine where the dividing line should be between the two systems. Mr. Harvey's view was that it could be drawn between the plant incorporating both the patented process and the patented genotype, and the variety which should not be subjected to the patent law, but should be covered by plant breeders' rights. That was the system which was being evolved in the United Kingdom and Mr. Harvey was of the view that it could be operated generally. However, the implications of dealing with living matter ought to be looked at by UPOV and WIPO in a joint meeting because it was only in that way that it would be possible to get a clear international view on the dividing line, which it was essential to draw.

245. Mr. Schlosser asked Mr. Harvey whether he saw an overlap if a variety incorporated genetic information that was patented by someone who did not develop the variety. He also asked what the rights should be in that case.

246. Mr. Harvey (United Kingdom) said that he thought that there was a need for a system whereby the patent holder could license the breeder to use his invention under the payment of a fee, and the breeder, in marketing his variety, could charge a royalty based on a number of costs including the payment of the patent fee.

247. Mr. Schlosser said that he now understood Mr. Harvey to mean that there was an overlap which could be resolved by the use of appropriate licensing.

248. Mr. Veldhuyzen van Zanten (ASSINSEL) said that the overlap only existed at the level of commercial plant material, whether belonging to a variety or not. Some members of ASSINSEL favored the standpoint of the ICC in saying that it should be left entirely to practice to find out where the overlap was and to resolve it. Others were of the view that if the conflicts arose at the level of the commercialization of plant material, a number of limitations should be found within the plant variety protection laws, and not in the patent laws. Those limitations could be for instance of the kind proposed by Mr. Harvey. Mr. Veldhuyzen van Zanten was of the view that it was not helpful to distinguish between direct use and indirect use of genotypes by saying that direct use was the isolation and the incorporation of a gene into plant material, because it deprived the breeder or the inventor of the gene from remuneration.

249. Mr. Williams (AIPPI) said that he did not want to imply earlier that he would not be supportive of patent protection for varieties. The basic concern was the protection of a commercial product, although one was likely to resort to a broad patent covering a range of varieties but containing a specific patent claim for the best embodiment of the invention, which, in the case of plants, might be a plant variety. One might consider that the alternative

would be to cover the broad scheme by a patent and to use plant variety protection to protect the specific variety. However, since there would probably always be some difference between the way the scope of a plant variety protection certificate was determined and a patent claim was interpreted, Mr. Williams was in favor of alternative forms of protection, giving the breeder the right to select the route he wanted to take.

250. M. Schlosser noted that in those countries where it was not possible to protect the specific embodiment--the variety--by a patent, it would have to be protected by a plant breeder's right, and everything else associated with the invention would be protected by a patent. Therefore, in those countries, a breeder doing what he was logically entitled to do would have to have two rights.

251. Mr. Williams (AIPPI) agreed and said that he recognized the fact that there was a legal impediment in most European countries to the claiming of a variety in a patent. He thought, however, that there was nothing inherently wrong about claiming varieties in a patent.

252.1 Mr. Kunhardt (Federal Republic of Germany) observed that numerous cases had been quoted in which an overlap could either be assumed or not assumed. Since one could not refer to all possible cases, it was probably not feasible to define what could and what could not be admitted as the subject matter of a patent. Moreover, as developments in genetic engineering presently stood, it was not possible to forecast the inventions that were yet to be made in that field and the implications they would have. It was already a problem to define with accuracy what constituted a plant variety and what was simply plant material. The impression could be gained from some of the patent applications that the claimed invention was only held patentable as a result of simply avoiding the word "plant variety." Depending on how the claim was formulated, it concerned either a plant variety or plant material. However, plant material could indeed constitute a variety or be manipulated and marketed in the form of a variety. That led to difficulties in drawing the line between a plant and a plant variety.

252.2 In view of all the problems that were already known and that could be expected, it would perhaps be useful to establish an abstract demarcation. Neither the UPOV Convention nor the plant variety protection laws were the proper framework for provisions on the grant of patents and their scope of protection. One solution, therefore, would be to include in the provisions of the UPOV Convention, as regards the effect of protection, that the assertion of rights under a legally granted plant breeder's right could not be prohibited on the basis of any other right of protection. That would mean that the other right would continue to be fully effective and to be assertable at will, apart from the exception referred to.

253. Mr. Royon (CIOPORA) said that where certain patents concerned plant material or plants, and not varieties, it was precisely because the inventor wished to cover much more than a simple variety. Mr. Royon pointed out that it was not for him to defend the interests of patent holders and that it seemed to him appropriate to discuss such matters in detail, not within the present meeting, but in a much wider forum, particularly that of WIPO. Nevertheless, he wished to make two small contributions to the debate by supporting the point of view expressed by Mr. Roberts and Mr. Williams that the two types of right could be made to cohabit and by observing that a problem could arise where a patented gene was introduced into a variety without the intervention of the breeder and without his knowledge.

254. Mr. Schlosser said that it seemed that everyone agreed that the contacts between UPOV and WIPO for the pursuance of this matter should be continued. On the matter of overlaps, some had said that there was an overlap, but that it was not important to resolve it. Others had said that there was no overlap. The meeting had tried to ascertain where the dividing line lay between plant breeders' rights and patents to the extent that some felt that that line was necessary. There had been a number of suggestions. Mr. Schlosser concluded by saying that all this would be considered to determine whether there was an overlap, and if so, the way in which that overlap could be resolved.

255. Mr. Clucas (ASSINSEL) said that his organization had moved quite slowly towards an established view on the revision of the Convention and patent protection in the field of biotechnology because it had been very concerned about the consequences of any particular decision. However, the broad canvas of ASSINSEL's thinking was now in favor of seeing UPOV as a center of excellence in the testing of plant varieties and concentrating on that area. No doubt there could be other routes that could be taken for the protection of varieties, but ASSINSEL believed that UPOV provided a good system which, however, needed strengthening. For plant genetic components, breeding processes, etc., ASSINSEL generally thought that the patent route seemed to be the right one. ASSINSEL's position on this whole area would be developed very shortly. Mr. Clucas said that there was clearly a need for joint discussions in UPOV and WIPO to look at the interface between the different kinds of protection. Generally, he wished to know how matters would proceed from here.

256. Mr. Schlosser replied that later in the week, the Council of UPOV would be considering how to organize the revision of the Convention. There was urgency in doing this and no time should be wasted. Mr. Schlosser could not say, at the present time, exactly how the revision work would be organized.

257. Mr. Clucas (ASSINSEL) said that there was a need for a document which set out how the interface between patents and plant variety protection could be dealt with in a revision of the Convention.

UPOV RECOMMENDATIONS ON VARIETY DENOMINATIONS

Introduction

258. Mr. Schlosser introduced document IOM/III/4. He said that these Recommendations had had a long and very involved history. At one time they had been Guidelines, but they were now called Recommendations, and the word "Recommendations" was intended to clarify that they were not mandatory in member States. They were simply suggestive of procedures that could be followed. Mr. Schlosser asked for the views of the international organizations on possible amendments or improvements in these Recommendations before they were presented to the Council for adoption.

General Statements

259. Mr. Royon (CIOPORA) expressed his satisfaction that the issue of the Recommendations had been entered on the agenda for the meeting. In a general way, he wished to repeat and confirm that Article 13 as contained in the 1978 revised text of the Convention gave satisfaction to CIOPORA which, however, proposed that the prohibition on denominations composed solely of figures be deleted in view of established usage for certain species. As far as the Recommendations were concerned, CIOPORA did not feel that they were all that

useful and thought that Article 13 was sufficient in itself. It would nevertheless make comments on the various Recommendations as and when they were discussed.

260. Mr. Clucas (ASSINSEL) said that he supported what Mr. Royon had said. Thus, subject to the elimination of the phrase concerning figures only, Mr. Clucas agreed that Article 13 was adequate as it now stood.

Recommendation 2

261.1 Mr. Royon (CIOPORA) emphasized that "average knowledgeable person" should be taken to mean a professional specialist; that was why CIOPORA preferred the term specialist to that of user.

261.2 In respect of subparagraph (1) of Recommendation 2, CIOPORA felt that it could be simply deleted. Indeed, it would seem hazardous to specify designations that could not be recognized or reproduced in speech or writing. If that expression were also to apply to designations or variety references that were difficult to pronounce, then CIOPORA would oppose the subparagraph in question since a word that is easy to pronounce for one person may be difficult for another. That point of view had been set out at length in the past. CIOPORA believed that one should rely on usage and the commercial good sense of those wishing to use a denomination. CIOPORA nevertheless welcomed the suppression of the phrase "easy to pronounce and easy to remember" but regretted that certain limitations of which it was unable to discern the true utility were to be maintained.

262. Mr. Slocock (AIPH) said that he thought that the developments of Mr. Royon seemed to underpin the need to have a recommendation like Recommendation 2.

263. Mr. Le Buanec (ASSINSEL) stated that the Maize Section of ASSINSEL supported the stance taken by CIOPORA on that item and felt that subparagraph (1) could be simply deleted.

264. Mr. Schlosser said that he had a question concerning the reference to "speech or writing". He wondered whether it should be "speech and writing" because the way it read now raised the possibility that one could reproduce in speech and not in writing, or in writing and not in speech.

265. Mr. Slocock (AIPH) stated, generally, that the points he had made on Article 13 during the discussion of document IOM/III/3 were also relevant to the UPOV Recommendations on Variety Denominations.

Recommendation 4

266. Mr. Royon (CIOPORA) noted that indent (i) of subparagraph (2) referred to designations that were subject to a prior right of another party and that one could reasonably think of rights deriving from registration of a trademark. CIOPORA observed that practice varied greatly between the UPOV member States: most States drew the attention of the applicant to the existence of a previous mark and even went so far as to ask for submission of another denomination. That was the correct way to go about it. Other States, on the other hand, accepted the denomination, even where they had received formal opposition from the owner of the mark. Such was the case, for example, of the Federal Republic of Germany, where the law required the owner of the mark to assert his rights.

That procedure led to additional expenditure for applicants for a plant variety certificate, gave an opportunity for litigation and complications. CIOPORA viewed it to be undesirable. On the contrary, it was desirable that national procedures be harmonized.

267. Mr. Donnenwirth (ASSINSEL) wished to know whether the examples quoted in Recommendation 4 were the only cases in which a proposed denomination would be refused or whether there were other examples that could differ from country to country.

268. Mr. Espenhain (Denmark) said that Recommendation 4 was clear and that there might be reasons other than those stated therein why a variety denomination might be refused.

269. Mr. Kunhardt (Federal Republic of Germany) stated that the examples given in Recommendation 4 constituted the most important instances. However, it was not possible to have a complete view of national laws and to check whether perhaps further grounds existed against the use of a variety denomination. The wording of the Recommendation was nevertheless quite clear.

270. Mr. Donnenwirth (ASSINSEL) observed that his question had apparently been badly put. He pointed out that, on the basis of the present Recommendations, denominations were refused, either for protection or for the marketing of varieties, for the reason that if protection for the varieties concerned were requested subsequently and that their denominations were not acceptable in line with the Recommendations, they would be in conflict with the principle of a single denomination for one and the same variety. Mr. Donnenwirth wondered whether any progress would be achieved by now giving a certain amount of latitude as to the use of denominations for the purposes of protection if there existed a recommendation elsewhere stating that what was not acceptable for marketing was not acceptable either for protection.

271. Mr. Espenhain (Denmark) said that the background for this Recommendation was that member States wanted to ensure that a denomination approved for protection purposes could and would be used in trade pursuant to Article 13(7) of the Convention. There was therefore no point in distinguishing between variety denominations used for plant breeders' rights and those used for variety listing and marketing, and member States did not intend to make such a distinction. He also said that the European Commission had said that if the member States of the European Community did not follow a common approach, then the Commission would have to establish guidelines on denominations to ensure that varieties would have the same denomination throughout the Community.

272. Mr. Donnenwirth (ASSINSEL) felt that the Recommendation under discussion was liable to be interpreted differently from one State to the other and therefore not to have a Union nature. That was in fact the problem he had wished to raise. On the basis of the rules that each country had the right to establish for marketing of varieties and taking into account the commitment to have the same denomination for marketing and protection, Mr. Donnenwirth wondered whether one was not on the way towards differing interpretations from one State to another and whether certain countries would not be more flexible than others, not as regards the recommendations for protection, but as regards the rules they would establish for the marketing of varieties on their territories.

273. Mr. Espenhain (Denmark) said that this Recommendation was intended to provide guidance not only to applicants and breeders but also to authorities. In Mr. Espenhain's view it also met a large number of the wishes of the international organizations. Also, it had been decided in the Administrative

and Legal Committee that the national authorities would try their utmost to avoid different opinions concerning variety denominations.

274. Mr. Schlosser said that Mr. Espenhain's statement was as far as the meeting could go on this subject.

275. Mr. Le Buanec (ASSINSEL) requested that those cases in which Recommendation 4 would apply should be exhaustively listed in order to progress towards true harmonization.

DEFINITION AND EXAMINATION OF HYBRID VARIETIES

276. Mr. Schlosser introduced document IOM/III/5. It was a proposal that had been introduced by the French delegation following a motion presented by ASSINSEL. Mr. Schlosser said that a slide presentation would be made on this subject, and he called upon Mr. Le Buanec of ASSINSEL to introduce the presentation.

277.1 Mr. Le Buanec (ASSINSEL), speaking on behalf of the Maize Section of ASSINSEL, welcomed the fact that the issue had been placed on the agenda of the present meeting in response to the request made, eight years ago already, at the Venice Congress of ASSINSEL. The reason for ASSINSEL's insistence was that the trade of maize breeder was a rather special one--the maize breeders had been the first to market first-generation hybrids in an industrial manner--and it was an extremely important matter for the profession.

277.2 Mr. Le Buanec reiterated the request made by the Maize Section of ASSINSEL that maize hybrids be defined and distinguished by their constituents, that is to say their parent lines, and the formula associating them. That request had led to problems of two kinds. As far as the regulations were concerned, the Office of UPOV had recently replied that the request was not admissible since it contradicted Article 6(1)(a) of the Convention. The Maize Section of ASSINSEL felt that the reply was no longer acceptable today since a revision of the Convention was now being studied and an amendment enabling the request to be acceded to could indeed be made. From a technical point of view, the difficulty lay in distinguishing the constituent elements of the hybrids. That was not in fact a new difficulty connected with lines or with hybrids, but a classical case of minimum distances. Various members of ASSINSEL had set up full-scale experiments, sometimes in association with official bodies, to determine how to define such minimum distances in the most objective way possible and to develop a reliable technique. Two groups were working more particularly on that question: on the one hand, the maize breeders in France, together with the official French bodies, and on the other hand, the firm Pioneer in the United States of America. The Maize Section of ASSINSEL had decided to discuss the results of that work at its next Congress in Brighton in 1988. That was why it had not as yet a final proposal to make but could simply show the approaches that had been adopted. For the French approach, a certain amount of information was given in document IOM/III/5. As far as the Pioneer approach was concerned, Mr. Smith could give a presentation if the meeting so wished.

278. Mr. Smith (ASSINSEL) thanked Mr. Schlosser and the meeting for the opportunity to give this presentation based on a study entitled "The Description and Assessment of Distance Between Cultivars of Maize," the full text of which is given in Annex II to this document. At the same time, he showed slides to illustrate his talk.

279. Mr. Schlosser thanked Mr. Smith for his presentation and said that it gave the opportunity to discuss whether the method of testing described by Mr. Smith would be acceptable in the UPOV member States and would satisfy the DUS requirements. He asked for comments on this question.

280. Dr. Böringer (Federal Republic of Germany) thanked the preceding speakers for their contributions, but felt that the time had not yet come to discuss these in detail. He would therefore welcome the contributions and illustrations being recorded as an annex to the report on the meeting.

281. Mr. Schlosser said that he understood that the study described by Mr. Smith was an intermediate study and that testing would continue. He asked the ASSINSEL delegation whether, in the future, the results of the study would be published in some definitive form.

282. Mr. Le Buanec (ASSINSEL) confirmed that it was only a part of the ongoing study and that much fuller results would be available in 1988. The full results would be communicated as soon as they were available, if wished. Mr. Le Buanec was also of the opinion that it was premature to discuss the presentation by Mr. Smith in detail since its main objective had been to describe a possible approach to the problem of hybrids.

283. Mr. Urselmann (COMASSO) pointed out that one of the basic principles of the UPOV Convention was the description of the variety as such in connection with the grant of protection. He said that the vegetable breeders in COMASSO asked that vegetables should be left outside the studies, at least for the time being.

284. Mr. Donnenwirth (ASSINSEL) stressed the importance of recording not the results presented, but the philosophy behind the research work: faced with a problem that was held to be scientific, an effort had been made to establish a scientific base that could be communicated to other breeders and to official plant variety protection bodies.

285. Mr. Espenhain pointed out that document IOM/III/5 had been discussed during a joint meeting between the Technical Committee and the Administrative and Legal Committee and would be discussed further in the Technical Working Party for Agricultural Crops. He said that the study from ASSINSEL was very much appreciated and the delegates would look forward to receiving more detailed results when they became available and to examining them in the Technical Committee and the Technical Working Parties.

CLOSING OF THE MEETING

286. Mr. Schlosser closed the meeting with the following words:

> "I thank, on behalf of the member States, each of the international organizations that took the time, trouble and expense to be here. We greatly appreciate your views. We are very receptive to them. We want you to know that as we embark on the revision of the Convention, your needs, and the needs of the public, are foremost in our minds. We will certainly keep you informed of developments and hope to hear from you as we develop new posi- tions. Again, I simply conclude this meeting with our thanks. As soon as we develop definitive plans for revising the Convention that can be made available to you, we will certainly do so. Thank you for your attendance."

[Annexes follow]

ANNEX I/ANNEXE I/ANLAGE I

LIST OF PARTICIPANTS/LISTE DES PARTICIPANTS/TEILNEHMERLISTE

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[Annex II follows/
L'annexe II suit/
Anlage II folgt]

ANNEX II

THE DESCRIPTION AND ASSESSMENT OF DISTANCE BETWEEN CULTIVARS OF MAIZE (Zea mays L.)

J.S.C. Smith and O.S. Smith*

INTRODUCTION

The requirement that new varieties must be distinctly different from previously released varieties is beneficial to agriculture, to plant breeding, and promotes the utilization and conservation of genetic resources. The availability of genetically different varieties can provide a farmer with the flexibility to choose the best adapted genotype and allows environmental and pest related risks to be spread across several genotypes. Plant breeders are encouraged to release different genotypes through independent breeding from different germplasms rather than by concentrating their resources upon a restricted, or even identical, genetic base. However, these objectives will only be achieved if varieties can be described accurately and if differences between varieties can be measured. The first of these two steps is important to achieve in itself, for it allows plant breeders to recoup their investment through the granting of plant breeders' rights or patents on novel varieties.

The description and assessment of distance between cultivars can thus be considered in two stages. First, the selection of a set of characters and protocols that can provide an accurate varietal description. Second, the establishment of a set of characters and protocols that can allow a comparison between varieties and provide a measure of their similarity or distinctness. The second step is more complex to resolve because it involves not only the question of which character should be used, but also a computation of distance and then a decision as to the level of difference at which varieties should be considered distinct, or conversely, at what level of similarity should varieties be considered not to be distinct.

We have attempted to resolve these issues by (i) estimating the reliability of numerous morphological descriptors, and (ii) by measuring distances between inbred lines of known pedigree relationship using several different descriptors. These different descriptors are: morphology, isozymes, zein, seed proteins, pedigree data, heterosis, F_1 yield and DNA restriction fragment profiles. We wish to evaluate the potential of each of these descriptors to predict genetic similarity. Our initial experiment (Heterosis I) included 31 inbred lines related by pedigree from 0 to 85%. A second similar experiment (Heterosis II) involving 10 lines related from 85 to 100% by pedigree is currently in progress. Preliminary data from this second experiment will be available in the next few weeks. A third similar experiment using closely related lines adapted to the European agricultural environment has also been initiated.

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RESEARCH DATA - PART ONE
THE USE OF MORPHOLOGICAL TRAITS AS DESCRIPTORS

Materials and Methods

Morphological data for 56 traits (Table 1) were collected at three locations in Iowa, United States of America, during 1985 and 1986, from a sample of five plants from each of 31 inbred lines (Table 2). An assessment of the utility of each trait (i.e., how well does the phenotype reflect the geneotype) was measured by calculating repeatabilities (t^2). Correlations between all pairs of traits were calculated in order to assess the independence of each trait. The importance of each trait in distinguishing between lines was determined by calculating the contribution made by each trait in principal component analysis.

Results

1. Repeatabilities of the Traits

Repeatabilities of each trait when measured across different combinations of numbers of locations, numbers of years and numbers of plants per location are given in Table 3. The largest repeatability estimates were for tassel and silk characters with vegetative characters having intermediate to high repeatabilities. Ninety-one percent of the traits had repeatabilities greater than or equal to 0.50 when measured in three locations over two years. This figure fell to 75% when data from two locations were collected over two years. The figure was reduced sharply to 45% when data from only one year were collected at three locations.

2. Correlation Between Traits

Those pairs of traits which had high degrees of correlation are presented in Table 4.

3. Importance of Traits in Distinguishing Among Lines

Most traits contributed significantly to the separation among lines. Only seven traits (bar glume anthocyanin, glume primary color, kernel weight, leaf length, number of tillers, plant height, sheath color) made no significant contribution.

Discussion

The reliability of morphological traits as descriptors can be biased by the environment in which the traits are measured (Comstock and Moll, 1963; Goodman and Paterniani, 1969; Goodman and Bird, 1977; Camussi et al., 1983; 1985; Patterson and Weatherup, 1984). The reliability of morphological characters for cultivar description can be increased by (i) eliminating those traits which show a high degree of environmental interaction, i.e., those traits for which the environmental effect is dependent on the genotype, and (ii) by collecting data in a number of environments. This study shows that at least for the range of germplasm studied herein, most morphological traits associated with the tassel and ear and many vegetative traits can be reliable descriptors, provided measurements are taken in at least two environments over two years. Traits that are highly correlated should not be given equal and independent worth in their ability to reveal distinctness.

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RESEARCH DATA - PART TWO
THE UTILITY OF MORPHOLOGICAL, BIOCHEMICAL AND GENETIC DESCRIPTORS FOR THE TESTING OF DISTINCTNESS BETWEEN INBRED LINES

Materials and Methods

For the 31 inbred lines (Table 2), distances between lines were calculated using 56 morphological traits that were relatively unaffected by environmental interaction (repeatability estimates of >/0.50 when measured in three locations across two years). Pairwise distances and associations between lines were revealed by principal component analysis (MORPHDI), and by canonical variate analysis (MAHDIST) in which lines were additionally constrained within seven groupings according to known pedigree. Isozymic data for 29 loci were obtained by starch gel electrophoresis (Cardy et al., 1980; 1983; Smith, 1984; Stuber et al., 1987). Modified Rogers' distances were calculated between lines (GDIST). Pedigree relationship data were calculated (Kempthorn, 1969; Delannay et al., 1983) and pairwise distances between lines (PCREL) were calculated by principal coordinate analysis. Zein chromatographic data were collected by reversed-phase high-performance liquid chromatography using both C_8 and C_{18} columns in separate experiments (Smith and Smith, 1986). The matrix of distances between lines (C8C18ADI) took into account both quantitative and qualitative differences in zein proteins between lines. Heterosis data (HBUACR) and yield of F_1 hybrids (FIBUA) were collected from F_1 and F_2 generations of seed that had been produced in the same environment. Yield testing was carried out using 60 plants of each F_1 and F_2 generation in two replicates at five locations from within Iowa, Illinois, Nebraska and Indiana over two years. Correlations of distance measures between lines were calculated based on distances determined from laboratory pedigree and field (heterosis) data.

Results

Correlations of distance measures between lines for each pair of distance measure criteria are presented in Table 5. Associations among lines on the basis of morphology alone (Fig. 1) and morphology constrained by pedigree, (Fig. 2) were essentially at random to any association that could have been expected on the basis of pedigree, heterosis or F_1 yield data. Isozymic data uniquely described all lines except for 207 and G29; similarly all lines except A632 and G53 gave different chromatograms. Taken together, isozymic and chromatographic data uniquely described all 31 lines. Distance measures based upon chromatographic (Fig. 3) and especially isozymic data (Fig. 4), gave correlations with those based upon pedigree, F_1 yield and heterosis that were higher than those revealed by morphological data. These correlations were, however, small (Table 5). The highest correlations between any distance measures were those between percent relationship by pedigree, F_1 yield and heterosis (Table 5, Figs. 5 and 6).

Discussion

Increased demands are now being placed upon systems to describe cultivars. Not only must varieties be described, but distances between lines need also to be calculated in order to ensure the release of different lines. In this respect, morphological data have limited usefulness because their expression can be biased by environmental interaction, and the genetic control of most

morphological traits is unknown but probably complex. Thus morphological data cannot easily nor precisely describe genotypes, nor can they reliably estimate relatedness between lines. This fact was demonstrated in the present study since the lowest correlation between distance measures were those involving morphological descriptors. Thus, phenotypic comparisons alone cannot always provide a sufficient criterion of distinctness. Furthermore, it is the breadth of the genetic base that has direct bearing on the potential to release diverse cultivars. Thus, the ability of each data set to discriminate between truly (genotypically) different cultivars, should be assessed with regard to an ability to show associations between lines that reflect genotypic differences. For this study, two parameters estimating genetic relatedness between lines were used. First, pedigree data which provide an estimate of relatedness based on all genes. However, distances calculated from pedigree data may be inaccurate because they assume no selection. Second, heterosis and F_1 yield data. These data survey loci which are (as of yet) unknown, but which are considered to be numerous and to be spread widely throughout the genome. However, the measurements of these traits are difficult because of environmental effects, and they are time consuming to perform.

Neither morphological, nor isozymic, nor zein chromatographic data could provide a measure of similarity between lines that accurately reflected genetic similarity as estimated either by pedigree or by heterosis data. However, morphological or biochemical similarity between lines might be used as an indication of possible genotypic similarity. Heterosis provided an estimate of similarity that correlated with the degree of relatedness based upon known pedigree. Thus measures of heterosis could be very useful as additional tests of similarity in those instances where morphological or biochemical data failed to show significant difference.

One critical issue remains to be addressed, this is, the level of distinctness that should be regarded as the threshold or level of minimum distance. These and other data that we are collecting from closely related lines in both the United States of america and Europe, could assist breeders and others in reaching a consensus as to the level of similarity on the basis of field performance, pedigree, or of overall genetic relatedness, that would represent the threshold level of distinctness. Our second and third heterosis experiments will reveal the degrees of morphological and biochemical difference and heterotic effect that are generally associated with various levels of pedigree relatedness found between lines. The data that we are collecting may then allow standards to be set that could:

1) provide a screen of probable distinctness based upon morphological and/or biochemical data, and

2) for remaining lines of possible similarity a further screen based on a more detailed and accurate estimation of field performance and of genotypic similarity as measured by heterosis, thus revealing lines that do not reveal a significant degree of difference.

A possible sequence of steps to test distinctness between inbreds could be as follows:

1) Measurements and careful observation of morphological data would give an initial indication of similar or identical materials.

2a) For a more precise evaluation of lines that are closely similar, a battery of morphological measurements, including important agronomic traits, would be taken in replicated plots across at least two-three locations and over two years, including a series of check lines as controls.

2b) Rapid laboratory tests, such as electrophoresis of isozymes and isoelectric focusing or chromatography of zein proteins, could additionally test the degree of difference between lines. Restriction Fragment Length Polymorphism (RFLPs) could also be tested if their separation and assay become economically feasible, and only after data related to residual heterozygosity within lines are collected.

2c) Materials would be placed into studies of heterosis which would also include crosses to a common set of testers.

The initial stages of this sequence of tests need not require any additional effort to that which is currently expended. No ruling of identicality or of unacceptedly close distance could be made without heterosis data. Important agronomic traits could carry additional weight and thus a final decision on distance need not be based solely on traits of trivial agricultural importance. At some stage, pedigree records should be supplied together with a signed affidavit testifying to their validity.

At the very least, we hope that our data and the approach that we are taking can promote discussion and contribute to solutions of the problems that are now faced in the description process.

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Table 1. Morphological traits measured in the present study.

A1. Measurements made at anthesis

Husk blade length	HUSK BLA	1-3	1, little; 2, moderate; 3, very long husk blade
Husk ciliation	HUSK CIL	1-3	1, little; 2, moderate; 3, very hairy husks
Pollen shed amount	POLL SHD	1-3	1, little, 2, moderate; 3, heavy pollen shed
Heat units to pollen shed	SHED HU	no.	Heat units accumulated from emergence to 50% pollen shed
Heat units to silk emergence	SILK HU	no.	Heat units accumulated from emergence to 50% silk emergence
Silk anthocyanin	SILK ANT	1-3	1, absent; 2, moderate; 3, much silk anthocyanin
Silk colour	SILK HUE	colour	Colour of silk
Silk colour saturation	SILK SAT	1-3	1, little; 2, moderate; 3, much colour saturation
Tassel floret density	TAS FLOR	cm	Number of paired spikelets in 4cm midsection of tassel central spike
Central spike length	CEN SPIK	cm	Length of tassel central spike
Tassel axis length	TAS AX L	cm	Length of tassel axis
Tassel peduncle length	TAS PD L	cm	Length of tassel peduncle
Tassel branch angle	TAS BR A	angle	Average angle of the lowest 4 tassel branches
Tassel branch length	TAS BR L	cm	Length of longest tassel branch
Tassel primary branch number	TAS 1BRN	no.	Number of primary tassel branches
Tassel secondary branch number	TAS 2BRN	no.	Number of seconday tassel branches
Anther primary colour	ANT 1HUE	colour	Predominant colour of anthers
Anther primary colour saturation	ANT 1SAT	1-3	1, little; 2, moderate; 3, much colour saturation
Anther secondary colour	ANT 2HUE	colour	Secondary (nonpredominant) colour of anthers (if present)
Anther secondary colour saturation	ANT 2SAT	1-3	1, little; 2, moderate; 3, much colour saturation
Glume primary color	GLU 1HUE	colour	Predominat colour of glumes
Glume primary colour saturation	GLU 1SAT	1-3	1, little; 2, moderate; 3, much colour saturation
Glume secondary colour	GLU 2HUE	colour	Seconday (nonpredominant) colour of glumes (if present)
Glume secondry colour saturation	GLU 2SAT	1-3	1, little; 2, moderate; 3, much colour saturation
Bar glume anthocyanin	BAR GLU	1-3	1, no; 2, moderate; 3, high degree of bar glume anthocyanin
Leaf angle	LEAF ANG	angle	Angle between main stem and leaf above ear leaf
Leaf attitude	LEAF ATT	1-3	1, no; 2, moderate; 3, strongly bent leaf
Leaf form	LEAF FRM	1-3	1, very tight; 2, medium; 3, very broad leaf form
Leaf variegation	VAR LEAV	1,2	1, leaves variegated; 2, leaves not variegated
Leaf length	LEAF LEN	cm	Length of ear leaf
Leaf width	LEAF WID	mm_2	Width of ear leaf (widest point)
Leaf area	LEAF ARE	cm^2	Leaf area
Leaf number	LEAF NO	no.	Number of leaves per plant
Sheath anthocyanin	SHTH COL	1-3	1, no; 2, moderate; 3, very heavy anthocyanin
Plant diameter	PLNT DIA	mm	Diameter at widest point of main stem
Internode length	INTN LEN	cm	Length from 3rd to 4th node of main stem
Ear height	EAR HGT	cm	Distance from soil level to base of main ear
Plant height	PLNT HGT	cm	Distance from soil level to top of central spike
Node number	NODE NO	no.	Number of nodes on main stem
Number of tillers	NO TILLR	no.	Number of tillers
Tiller height	TILLR HT	1-3	1, <33; 2, 34-66; 3, ≥67 percent of main stem equals tiller height

B). Measurements taken at harvest

Ear number	EAR	NUM	no.	Number of ears per plant
Ear diameter	EAR	DIA	mm	Diameter of ear (unshelled)
Ear length	EAR	LEN	cm	Length of ear
Ear weight	EAR	WT	g	Weight of husked ear (unshelled)
Cob diameter	COB	DIA	mm	Diameter of cob (shelled)
Kernel colour	KERN	HUE	colour	Colour of endosperm
Kernel colour saturation	KERN	SAT	1-3	1, little; 2, moderate; 3, much colour saturation
Kernel type	KERN	TYP	1,2	1, shrunken; 2, normal
Kernel number per row	KERN	NO R	no.	Number of kernels per row
Number of kernel rows	KERN	ROW	no.	Number of kernel rows per ear
Kernel length	KERN	LEN	mm	Length of kernel (mean of 10 kernels per plant)
Kernel width	KERN	WID	mm	Width of kernel (mean of 10 kernels per plant)
Kernel weight	KERN	WT	g	Weight of 100 kernels
Cob pith diameter	PITH	DIA	mm	Diameter of cob pith
Ear shape	EAR	SHP	1-3	1, cylindrical; 2, medium; 3, conical ear shape

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Table 2. Lines used in the present study. Lines used to make the diallel crosses are underlined. (Proprietary codes of Pioneer Hi-Bred International, Inc. are used unless the inbred is publicly available. In that case, the public code is given and denoted on such by an asterisk).

Inbred	Pedigree Background[1)]	Inbred	Pedigree Background[1)]
814	A	211	F
G42	A	B46	F
G83	A	B47	F
251	B	G39	F
848	B	G53	F
G50	B	G74	F
G55	B	G80	F
*Mo17	C	G86	F
207	D	Z38	F
G29	D	*A632	F
G81	D	*B73	F
K42	D	G12	G
595	E	G71	G
B76	E	N65	G
G35	E		
G84	E		
V25	E		

[1)] Identical letters denote inbreds of similar germplasm background according to known pedigree.

Table 3. Repeatability (t^2) estimates for morphological traits.

Trait	Over 2 years t^2 (3 locs/yr)	Over 2 years t^2 (2 locs/yr)	Over 2 years t^2 (1 loc/yr)	Over 2 years t^2 (3 locs/yr)
HUSK BLA	0.86	0.65	0.50	0.20
HUSK CIL	0.71	0.47	0.32	0.50
POLL SHD	0.37	0.16	0.10	0.11
SHEDT HU	0.81	0.58	0.42	0.65
SILK HU	0.82	0.61	0.45	0.71
SILK ANT	0.97	0.91	0.85	0.89
SILK HUE	0.96	0.90	0.83	0.85
SILK SAT	0.85	0.61	0.45	0.31
TAS FLOR	0.94	0.85	0.79	0.74
CEN SPIK	0.95	0.87	0.81	0.74
TAS AS L	0.96	0.90	0.86	0.77
TAS PD L	0.91	0.77	0.71	0.65
TAS BR A	0.93	0.83	0.74	0.72
TAS BR L	0.95	0.87	0.80	0.78
TAS 1^{ry} BRN	0.98	0.93	0.89	0.86
TAS 2^{ry} BRN	0.91	0.78	0.74	0.64
ANT 1^{ry} HUE	0.97	0.91	0.87	0.73
ANT 1^{ry} SAT	0.49	0.33	0.22	0.20
ANT 2^{ry} HUE	0.85	0.85	0.52	0.01
ANT 2^{ry} SAT	0.82	0.83	0.52	0.30
GLU 1^{ry} HUE	0.64	0.65	0.25	0.25
GLU 1^{ry} SAT	0.31	0.12	0.09	0.25
GLU 2^{ry} HUE	0.23	0.18	0.05	0.20
GLU 2^{ry} SAT	0.83	0.78	0	0.30
BAR GLUM	0.68	0.44	0.42	0.19
LEAF ANG	0.94	0.87	0.87	0.71
LEAF ATT	0.80	0.65	0.65	0.36
LEAF FRM	0.84	0.67	0.67	0.41
VAR LEAV	0.06	0.13	0.13	0
LEAF LEN	0.91	0.86	0.83	0.32
LEAF WID	0.85	0.73	0.73	0.14
LEAF ARE	0.89	0.84	0.78	0.62
LEAF NO.	0.84	0.66	0.55	0.66
SHTH COL	0.52	0.26	0.16	0
PLNT DIA	0.73	0.50	0.41	0.21
INTN LEN	0.60	0.35	0.29	0.26
EAR HGT	0.90	0.77	0.66	0.65
PLNT HGT	0.92	0.80	0.69	0.62
NODE NO.	0.83	0.63	0.50	0.45
NO. TLLR	0.76	0.42	0	0
EAR NO.	0.57	0.29	0.21	0
EAR DIA	0.91	0.80	0.74	0.51
EAR LEN	0.59	0.36	0.32	0
EAR WT	0.80	0.59	0.47	0.24
COB DIA	0.92	0.82	0.72	0.57
KERN HUE	0.81	0.61	0.43	0.70
KERN SAT	0.68	0.40	0.27	0.14
KERN TYP	0.17	0.07	0	0
KERN NO./R	0.72	0.49	0.36	0.31
KERN ROW	0.94	0.86	0.81	0.75
KERN LEN	0.87	0.74	0.64	0.64
KERN WID	0.93	0.85	0.79	0.65
KERN WT	0.74	0.53	0.52	0.40
PITH DIA	0.86	0.71	0.65	0.56
EAR SHAP	0.76	0.55	-	ND

Table 4. Pairs of morphological traits which showed correlations ≥0.70 or ≤-0.70.

Traits	Correlation
SILK HU - SHED HU	0.94
SILK HUE - SILK ANT	-0.94
KERN SAT - KERN HUE	0.89
LEAF NO. - NODE NO.	0.84
LEAF FRM - LEAF ATT	0.83
KERN WT - KERN WID	0.81
LEAF ANG - LEAF ATT	0.81
LEAF ANG - LEAF FRM	0.81
PLNT HGT - EAR HGT	0.79
COB DIA - KERN ROW	0.78
BAR GLUM - VAR LEAV	0.76
GLU 1^{ry} HUE - VAR LEAV	-0.75
LEAF ARE - LEAF WID	0.75
PLNT HGT - NODE NO.	0.75
COB DIA - EAR DIA	0.74
KERN HUE - KERN TYP	0.74
SILK ANT - SILK SAT	0.73
SHED HU - CEN SPIK	0.72
KERN THK - SILK HU	0.71
LEAF ARE - SHED HU	0.71
PITH DIA - COB DIA	0.71
KERN THK - SHED HU	0.70

Table 5. Pearson correlation coefficients between the various data sets used to estimate associations or distances between lines.

PEARSON CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / NUMBER OF OBSERVATIONS

	MPCREL	GDIST	MAHDIST	C8C18ADI	F1BUA	HBUACR	MORPH_DI
MPCREL	1.00000 0.0000 467	-0.49675 0.0001 467	-0.25649 0.0001 467	-0.32533 0.0001 467	-0.86393 0.0001 105	-0.79187 0.0001 105	-0.30094 0.0001 436
GDIST	-0.49675 0.0001 467	1.00000 0.0000 467	0.09452 0.0412 467	0.20005 0.0001 467	0.56148 0.0001 105	0.53895 0.0001 105	-0.00974 0.8394 436
MAHDIST	-0.25649 0.0001 467	0.09452 0.0412 467	1.00000 0.0000 467	-0.04642 0.3168 467	0.34554 0.0003 105	0.34248 0.0003 105	0.34272 0.0001 436
C8C18ADI	-0.32533 0.0001 467	0.20005 0.0001 467	-0.04642 0.3168 467	1.00000 0.0000 467	0.43108 0.0001 105	0.42363 0.0001 105	-0.06129 0.2015 436
F1BUA	-0.86393 0.0001 105	0.56148 0.0001 105	0.34554 0.0003 105	0.43108 0.0001 105	1.00000 0.0000 105	0.85756 0.0001 105	0.28943 0.0040 97
HBUACR	-0.79187 0.0001 105	0.53895 0.0001 105	0.34248 0.0003 105	0.42363 0.0001 105	0.85756 0.0001 105	1.00000 0.0000 105	0.27560 0.0063 97
MORPH_DI	-0.30094 0.0001 436	-0.00974 0.8394 436	0.34272 0.0001 436	-0.06129 0.2015 436	0.28943 0.0040 97	0.27560 0.0063 97	1.00000 0.0000 466

Figure Legends

Figure 1a Scatter plot of distances between lines on the basis of pedigree (percent relationship, PCREL) versus morphology.

Figure 1b Scatter plot of distances between lines on the basis of heterosis versus morphology.

Figure 1c Scatter plot of distances between lines on the basis of F_1 yield versus morphology.

Figure 2a Scatter plot of distances between lines on the basis of pedigree (percent relationship, PCREL) versus morphology constrained by pedigree.

Figure 2b Scatter plot of distances between lines on the basis of heterosis versus morphology constrained by pedigree.

Figure 2c Scatter plot of distances between lines on the basis of F_1 yield versus morphology constrained by pedigree.

Figure 3a Scatter plot of distances between lines on the basis of pedigree (percent relationship, PCREL) versus zein chromatographic data.

Figure 3b Scatter plot of distances between lines on the basis of heterosis versus zein chromatographic data.

Figure 3c Scatter plot of distances between lines on the basis of F_1 yield versus zein chromatographic data.

Figure 4a Scatter plot of distances between lines on the basis of pedigree (percent relationship, PCREL) versus isozyme data.

Figure 4b Scatter plot of distances between lines on the basis of heterosis versus isozyme data.

Figure 4c Scatter plot of distances between lines on the basis of F_1 yield versus isozyme data.

Figure 5 Scatter plot of distances between lines on the basis of heterosis and pedigree (percent relationship, PCREL).

Figure 6 Scatter plot of distances between lines on the basis of F_1 yield and pedigree (percent relationship, PCREL).

HETEROSIS STUDY 85-86 DATA

PLOT OF PERCENT RELATIONSHIP
VERSUS MALAHANOBIS DISTANCE BASED ON MORPHOLOGICAL DATA

FIGURE 1a

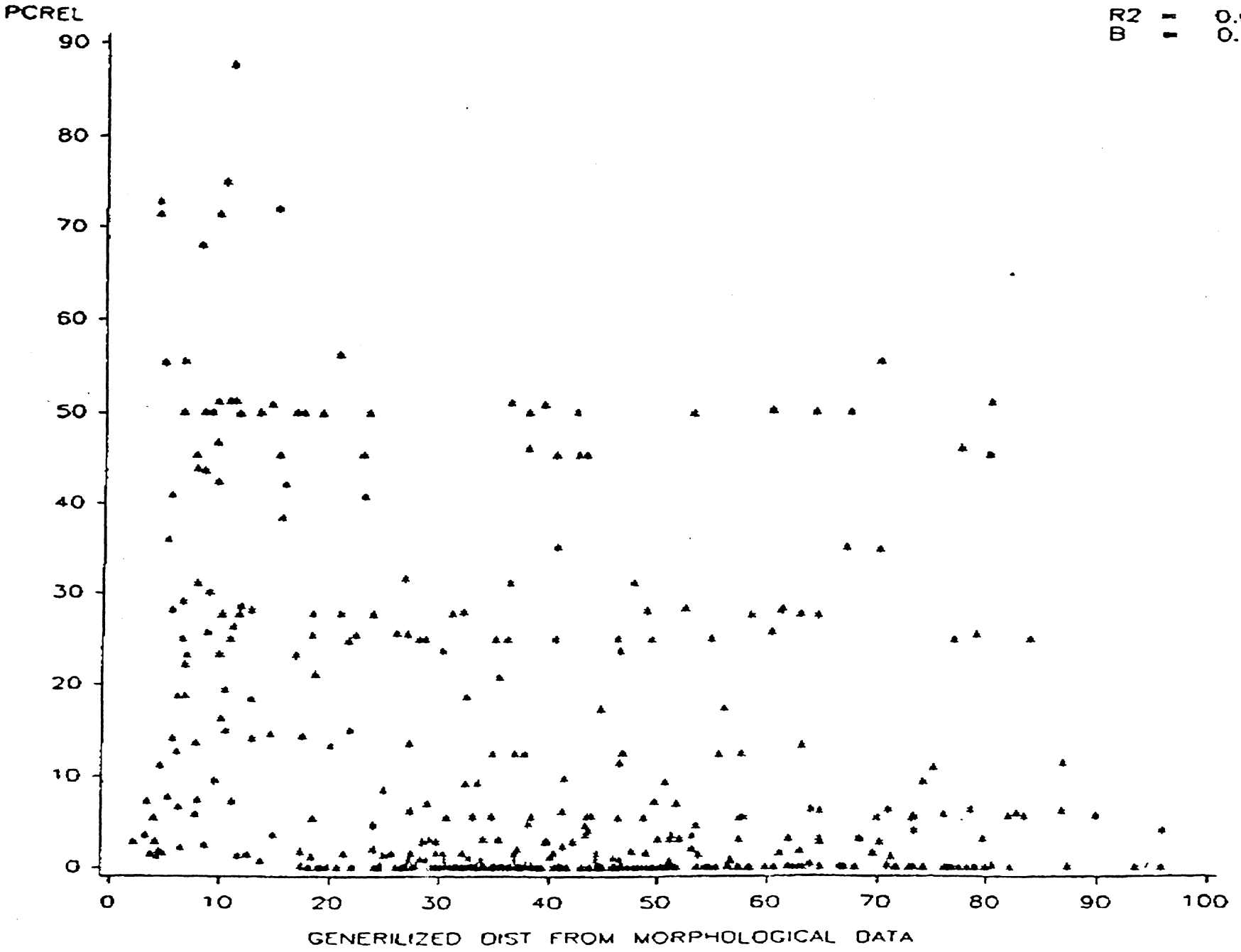


FIGURE 1b

HETEROSIS STUDY 85-86 DATA

PLOT OF HETEROSIS (2*(F1-F2)) IN PERCENT
VERSUS MALAHANOBIS DISTANCE BASED ON MORPHOLOGICAL DATA
TRAIT = GRAIN YIELD

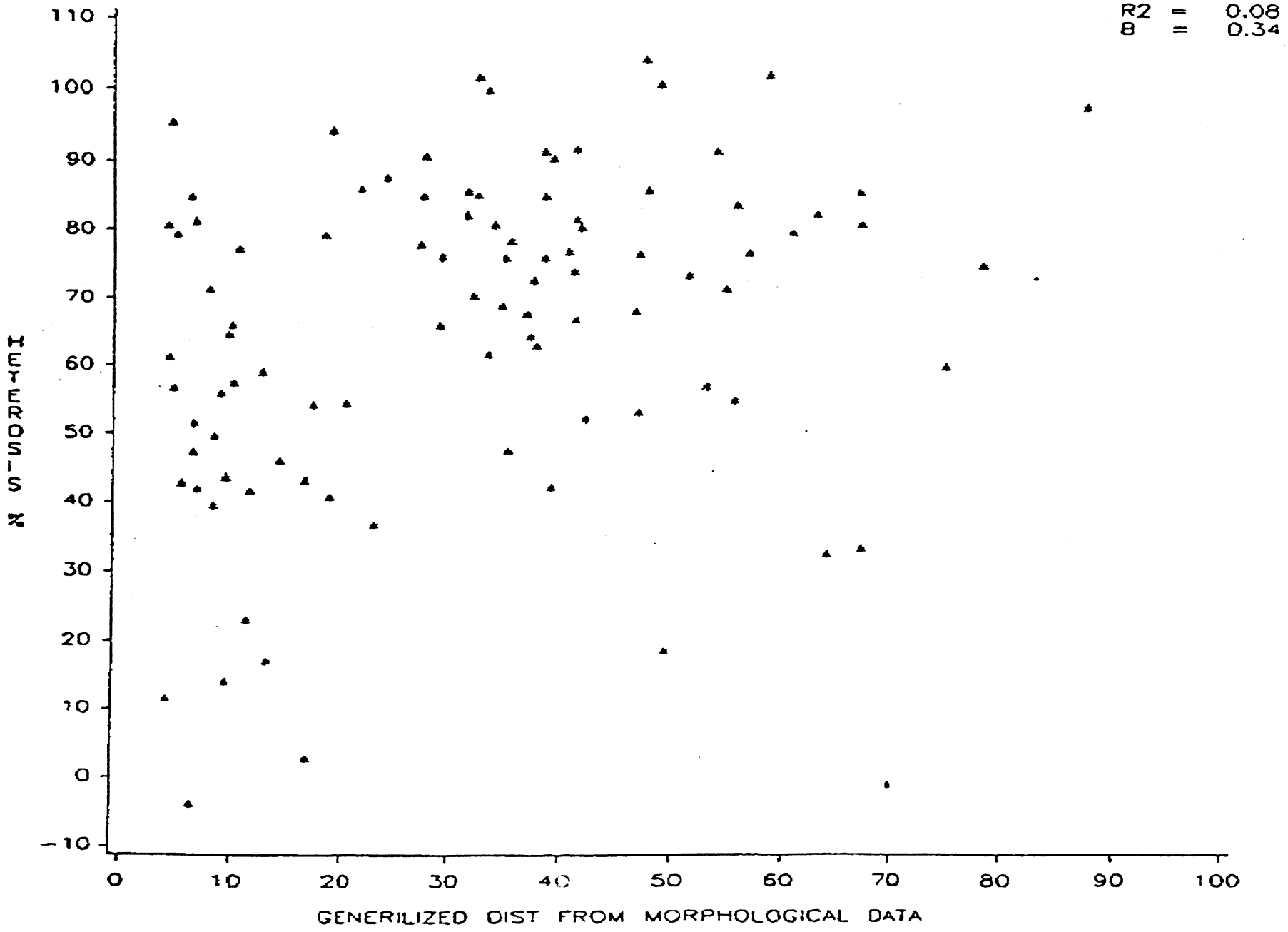
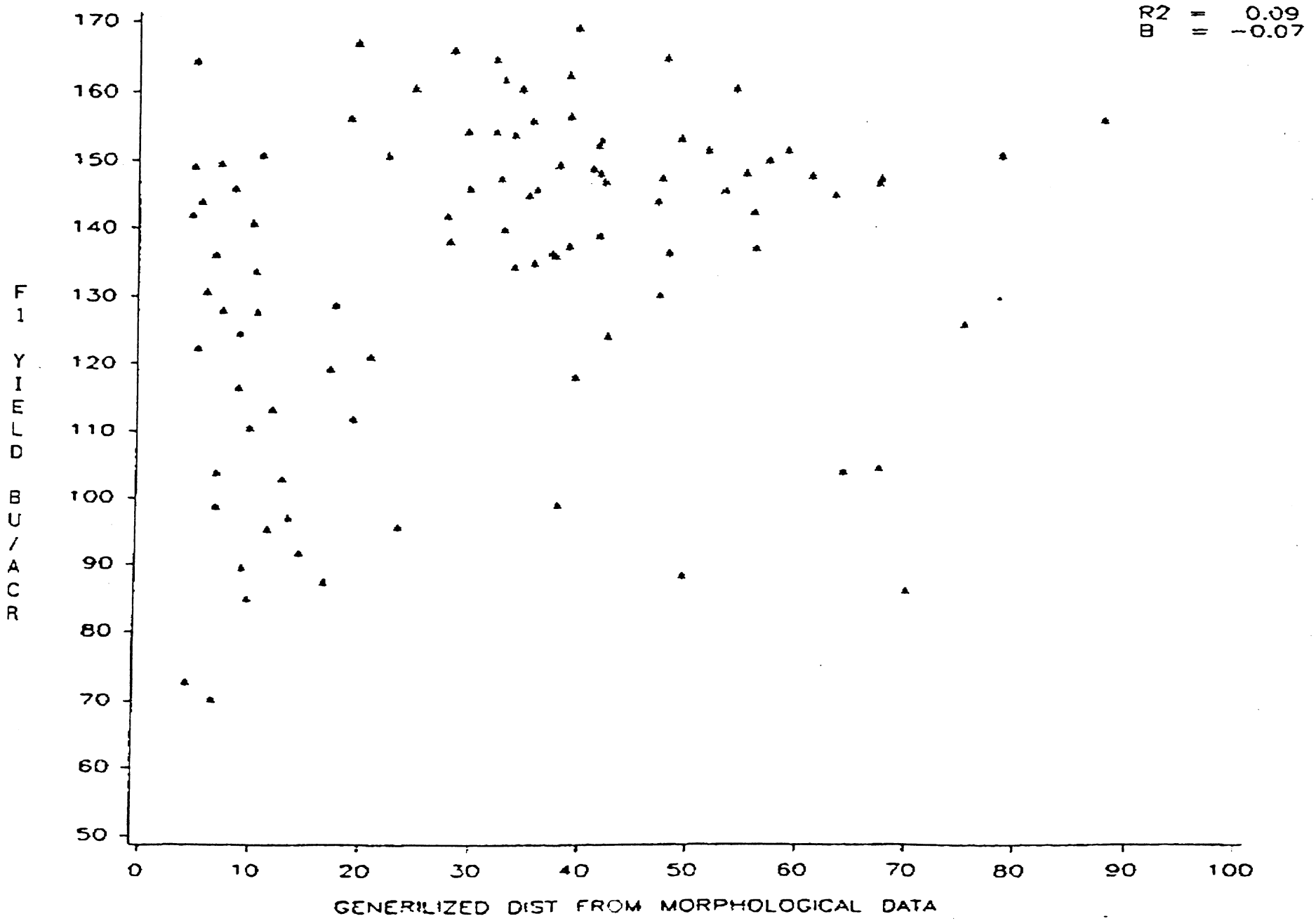


FIGURE 1c

HETEROSIS STUDY 85-86 DATA

PLOT OF F1 YIELDS IN BUSHELS PER ACRE
VERSUS DISTANCE FROM HPLC ANALYSIS
TRAIT = GRAIN YIELD



HETEROSIS STUDY 85-86 DATA

FIGURE 2a

PLOT OF PERCENT RELATIONSHIP
VERSUS MALAHANOBIS DISTANCE BASED ON MORPHOLOGICAL DATA

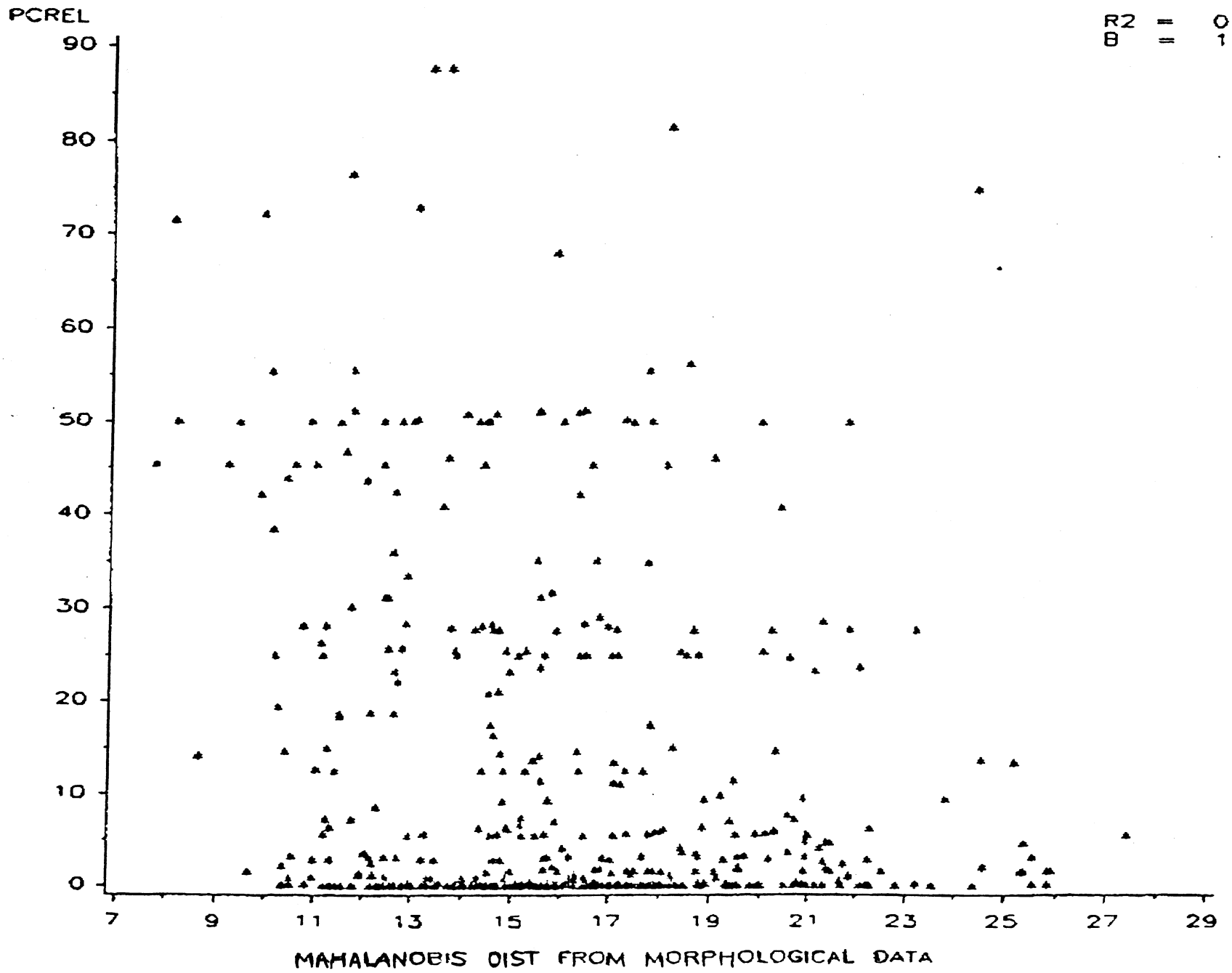
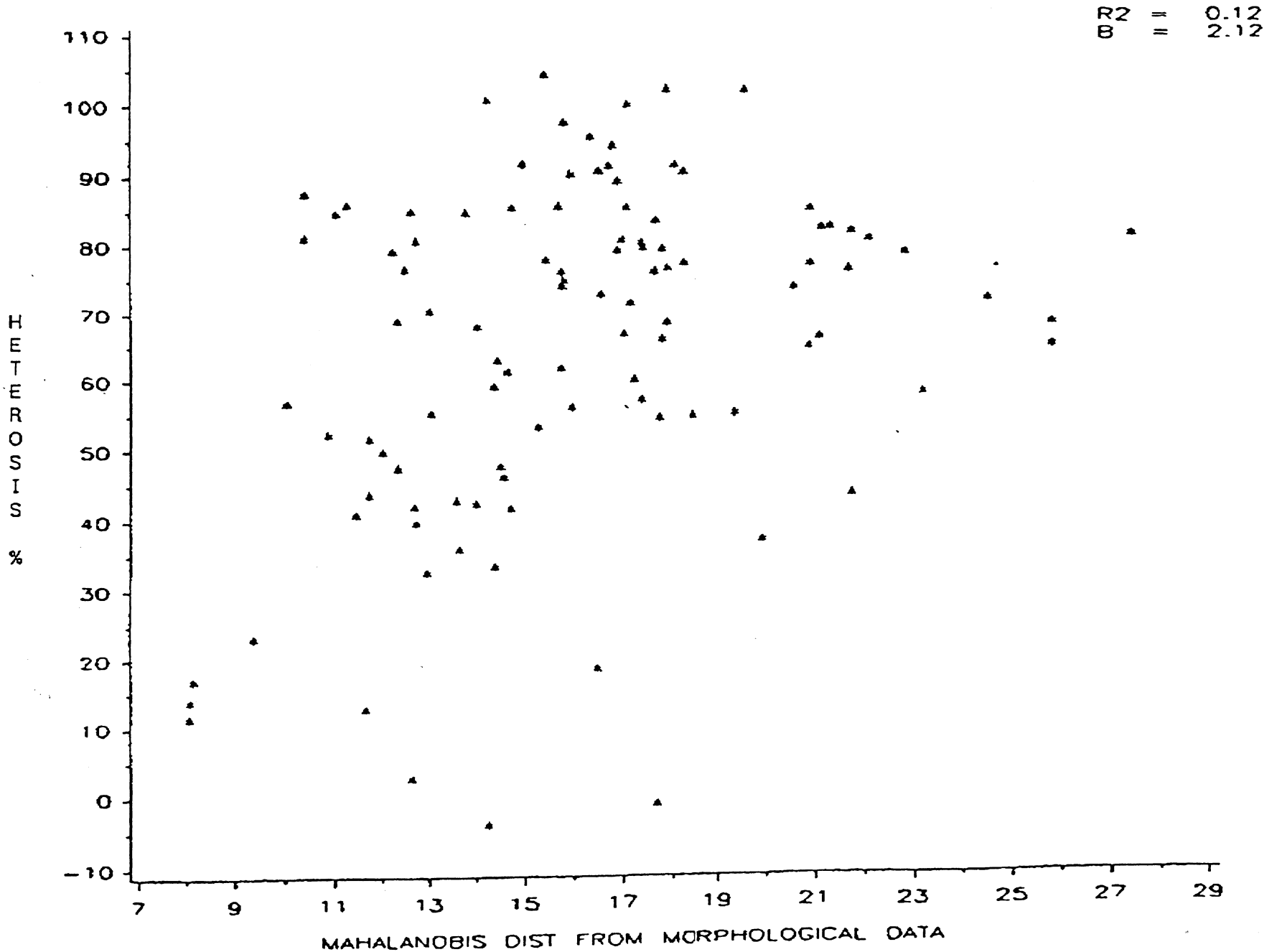


FIGURE 2b

HETEROSIS STUDY 85-86 DATA

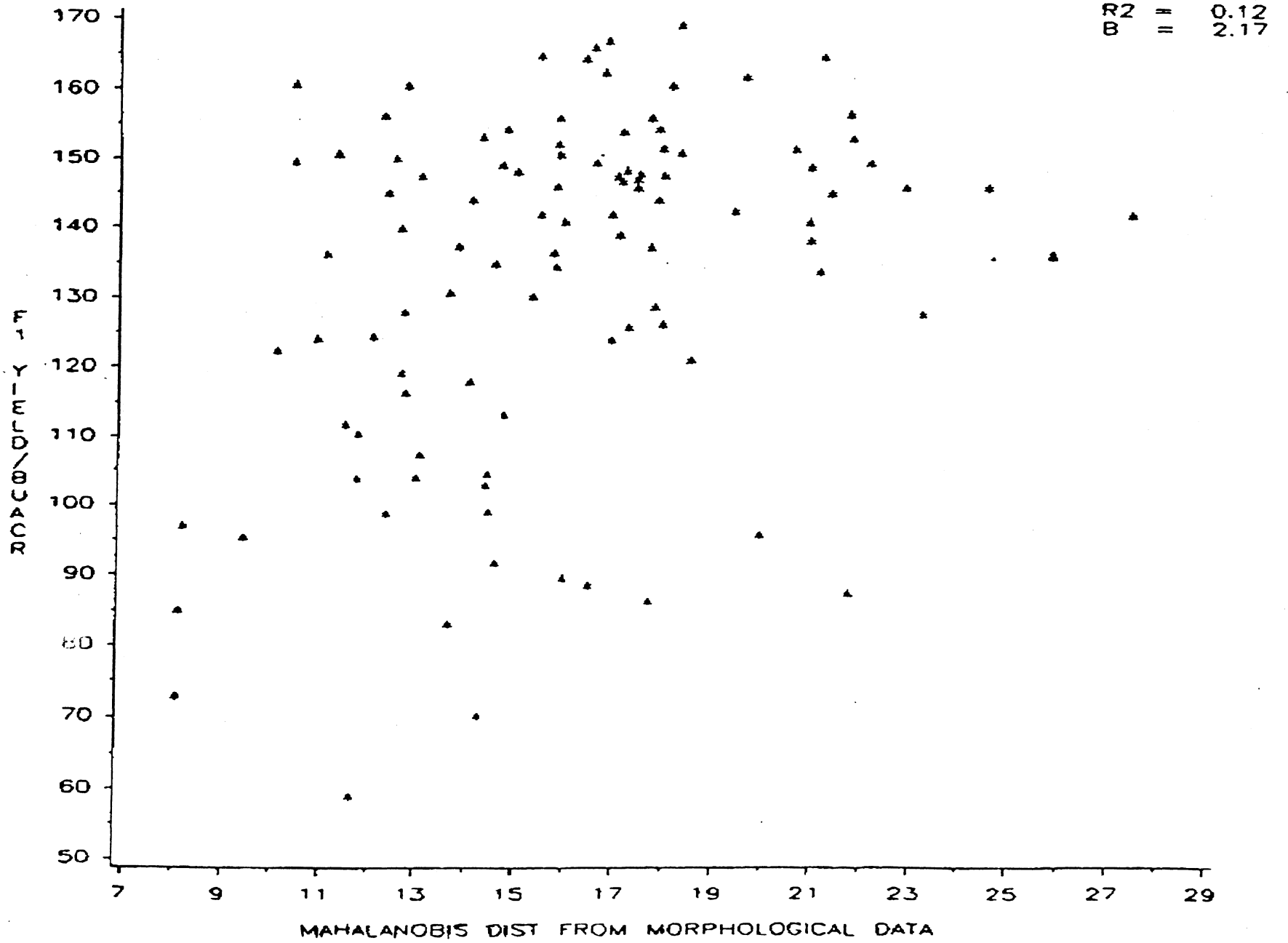
PLOT OF HETEROSIS (2*(F1-F2)) IN PERCENT
VERSUS MALAHANOBIS DISTANCE BASED ON MORPHOLOGICAL DATA
TRAIT = GRAIN YIELD



HETEROSIS STUDY 85-86 DATA

FIGURE 2c

PLOT OF F1 YIELDS IN BUSHELS PER ACRE
VERSUS MALAHANOBIS DISTANCE BASED ON MORPHOLOGICAL DATA
TRAIT = GRAIN YIELD



HETEROSIS STUDY 85-86 DATA

PLOT OF PERCENT RELATIONSHIP
VERSUS DISTANCE FROM HPLC ANALYSIS

FIGURE 3a

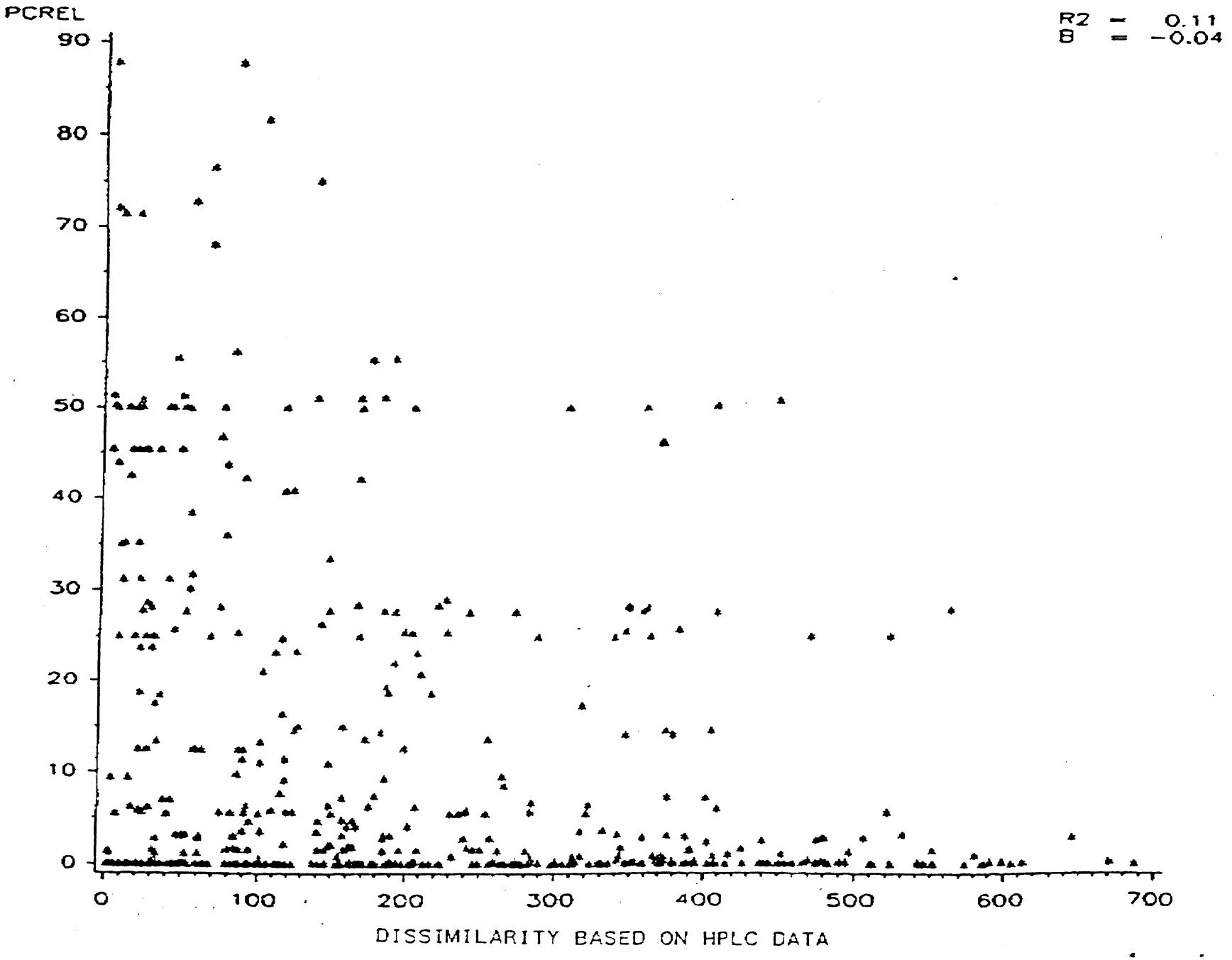


FIGURE 3b

HETEROSIS STUDY 85-86 DATA

PLOT OF HETEROSIS (2*(F1-F2)) IN PERCENT
VERSUS DISTANCE FROM HPLC ANALYSIS
TRAIT = GRAIN YIELD

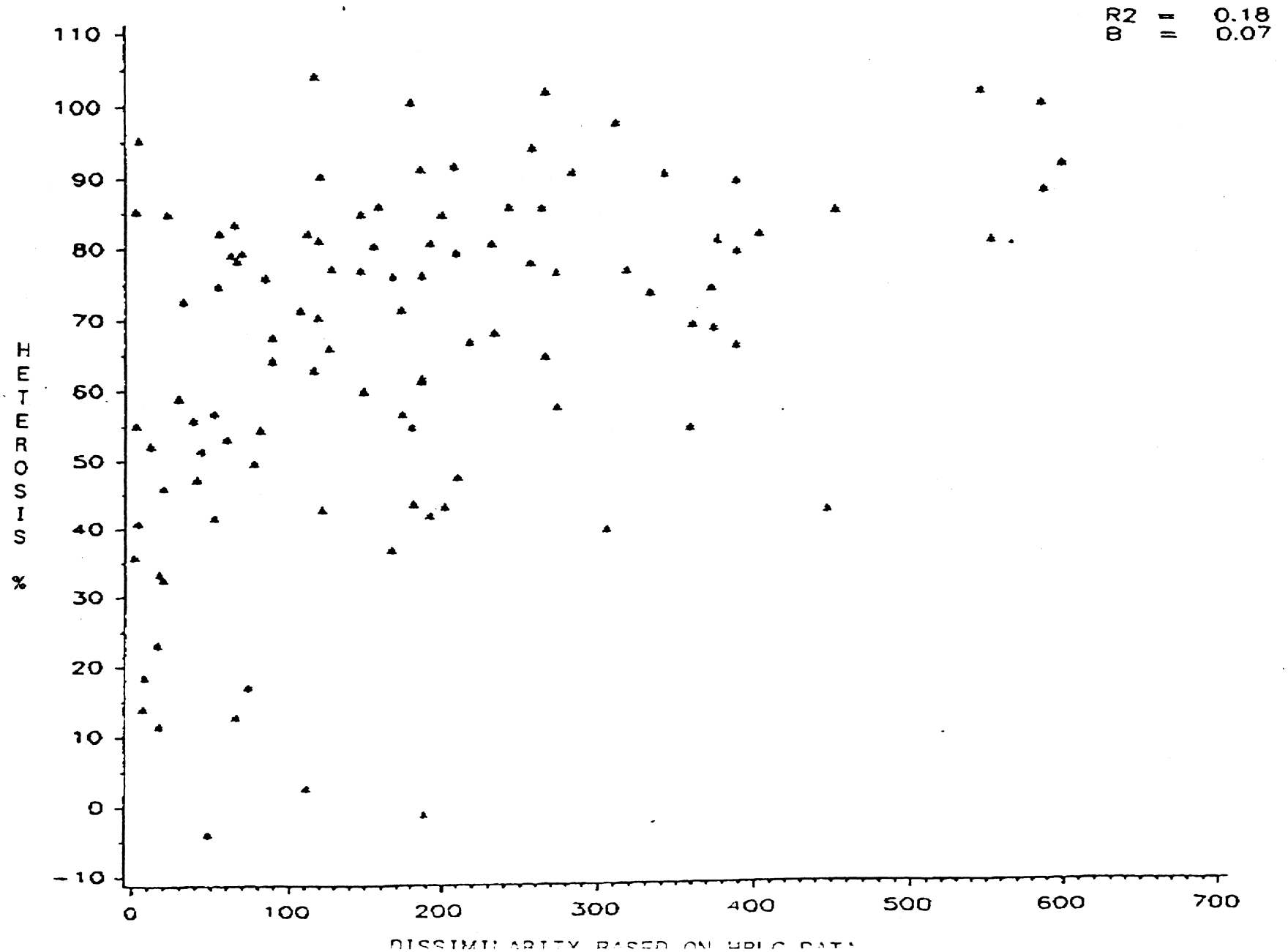


FIGURE 3c

HETEROSIS STUDY 85-86 DATA

PLOT OF F1 YIELDS IN BUSHELS PER ACRE
VERSUS DISTANCE FROM HPLC ANALYSIS
TRAIT = GRAIN YIELD

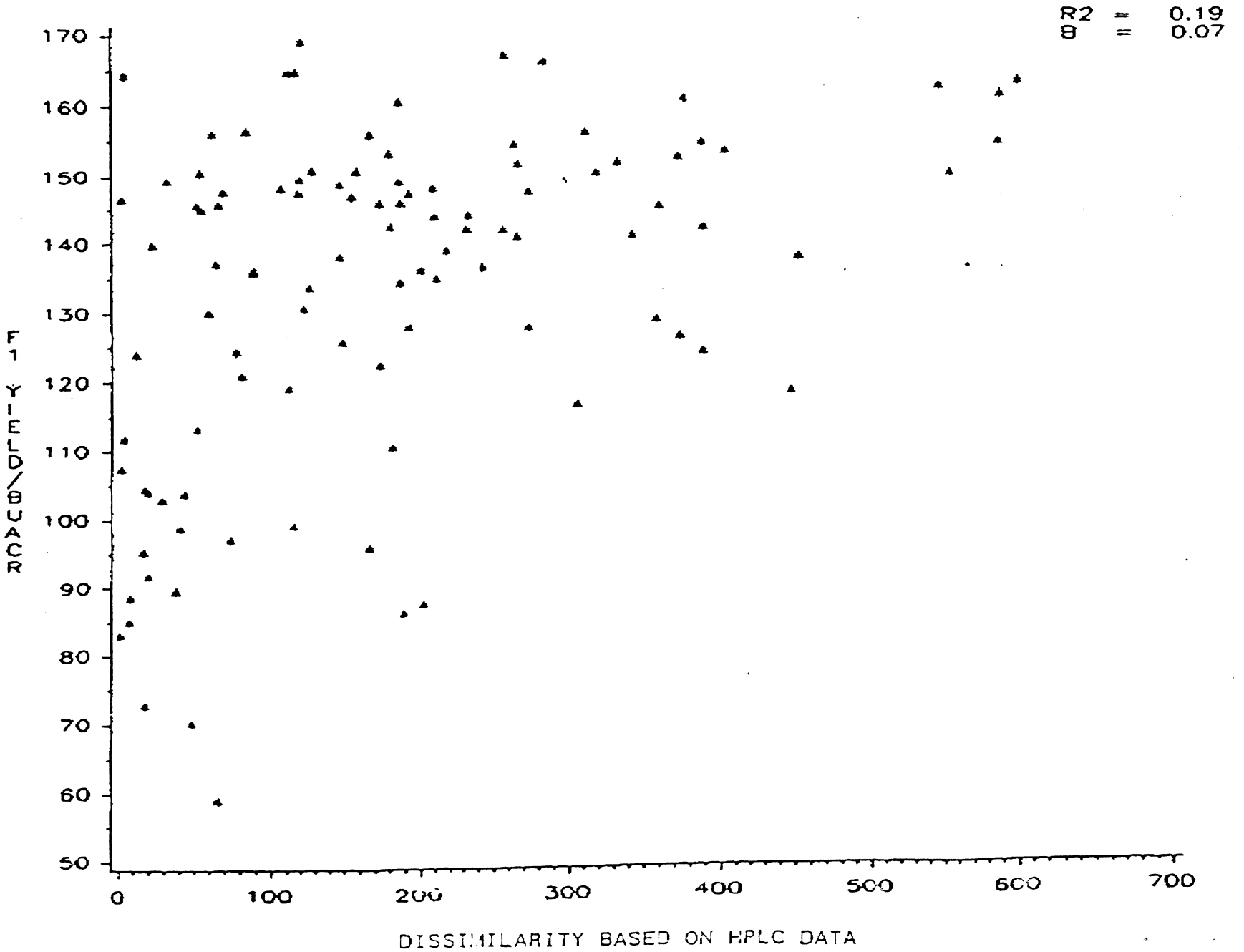
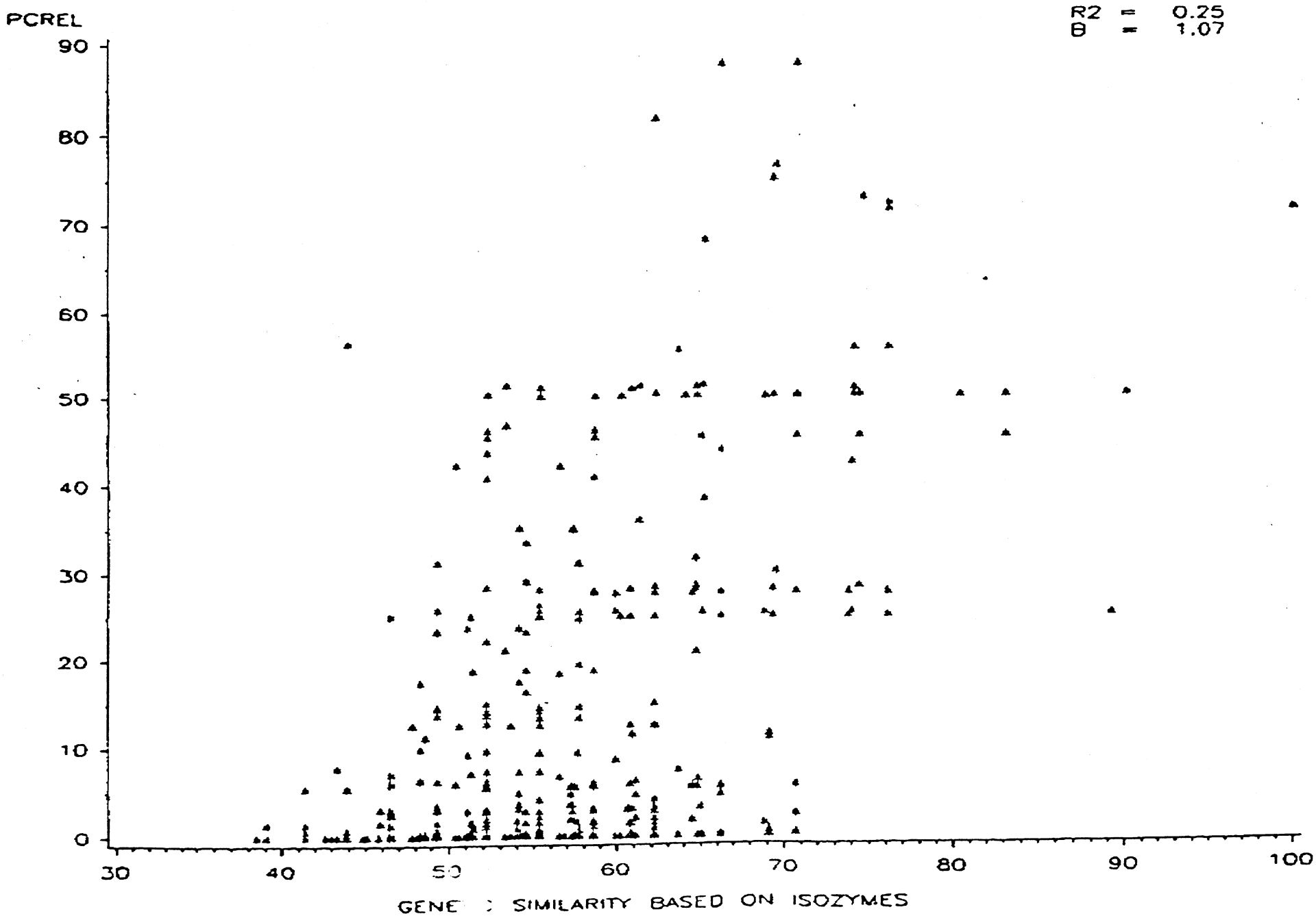


FIGURE 4a

HETEROSIS STUDY 85-86 DATA

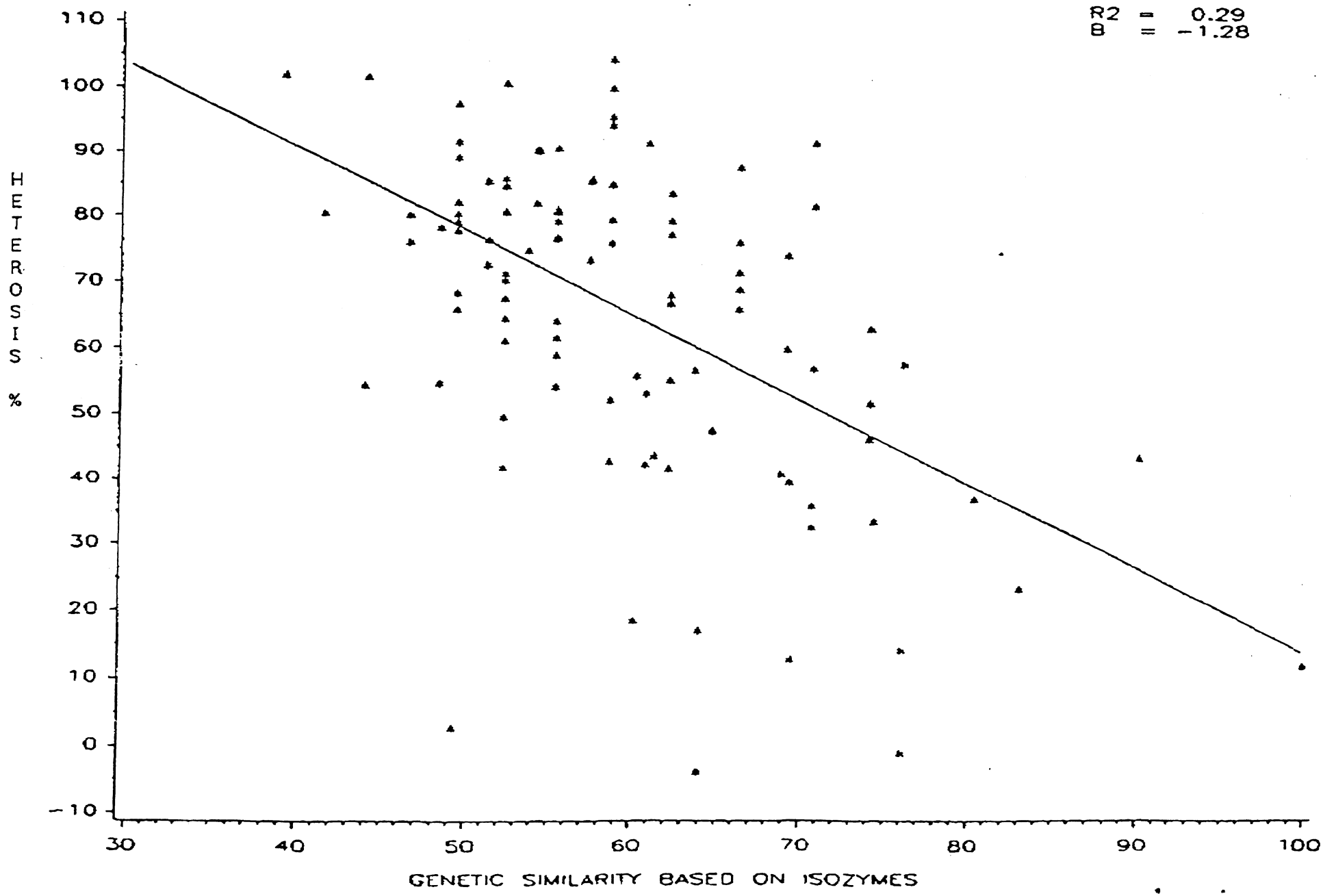
PLOT OF PERCENT RELATIONSHIP
VERSUS GENETIC DISTANCE BASED ON ISOZYMES



HETEROSIS STUDY 85-86 DATA

PLOT OF HETEROSIS (2*(F1-F2)) IN PERCENT
VERSUS GENETIC DISTANCE BASED ON ISOZYMES
TRAIT = GRAIN YIELD

FIGURE 4b



HETEROSIS STUDY 85-86 DATA

PLOT OF F1 YIELDS IN BUSHELS PER ACRE
VERSUS GENETIC DISTANCE BASED ON ISOZYMES
TRAIT = GRAIN YIELD

FIGURE 4c

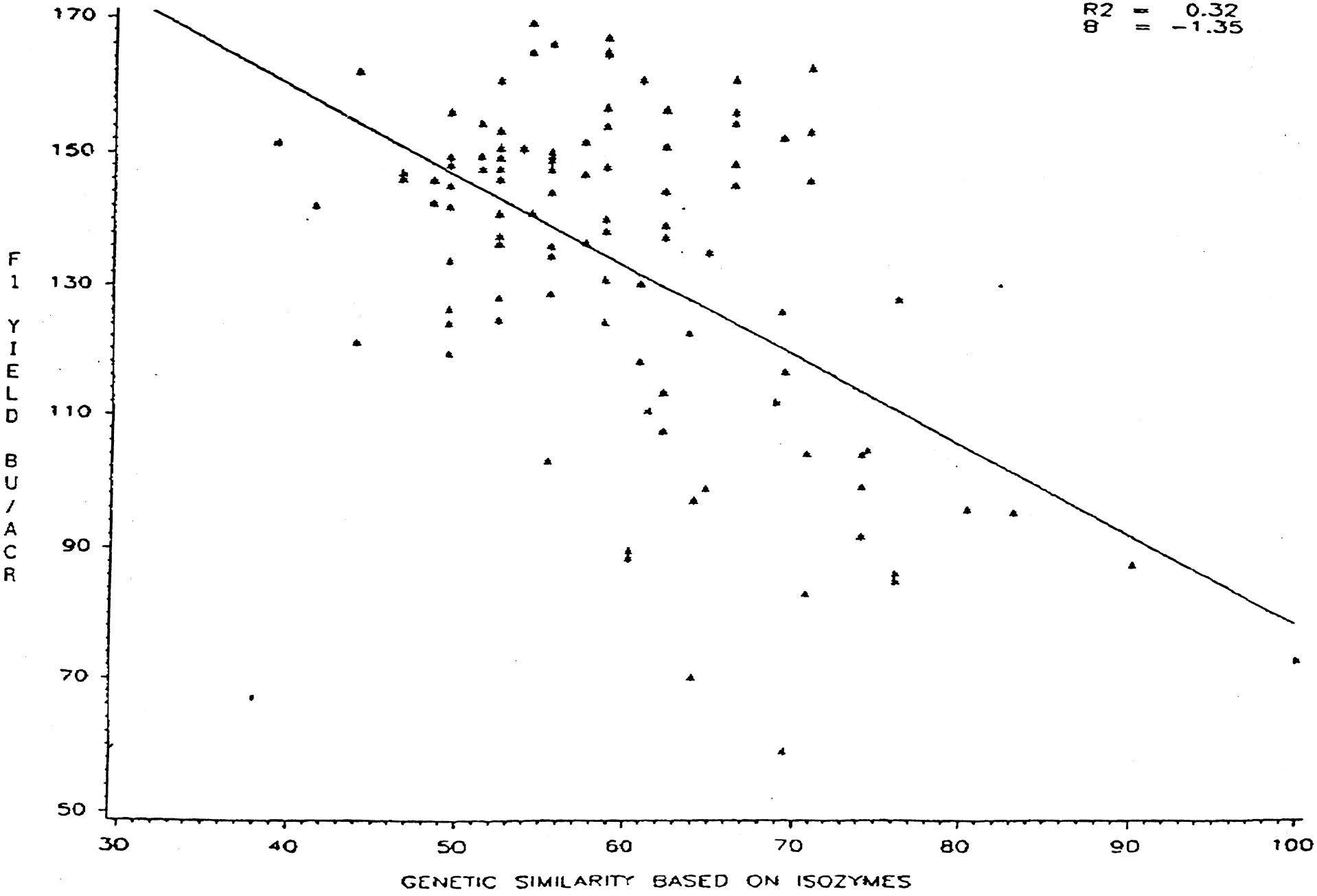


FIGURE 5

HETEROSIS STUDY 85.86 DATA

PLOT OF F1-F2 DIVIDED BY F1 EXPT MEAN
VERSUS PERCENT RELATIONSHIP OF PARENTS
TRAIT = GRAIN YIELD

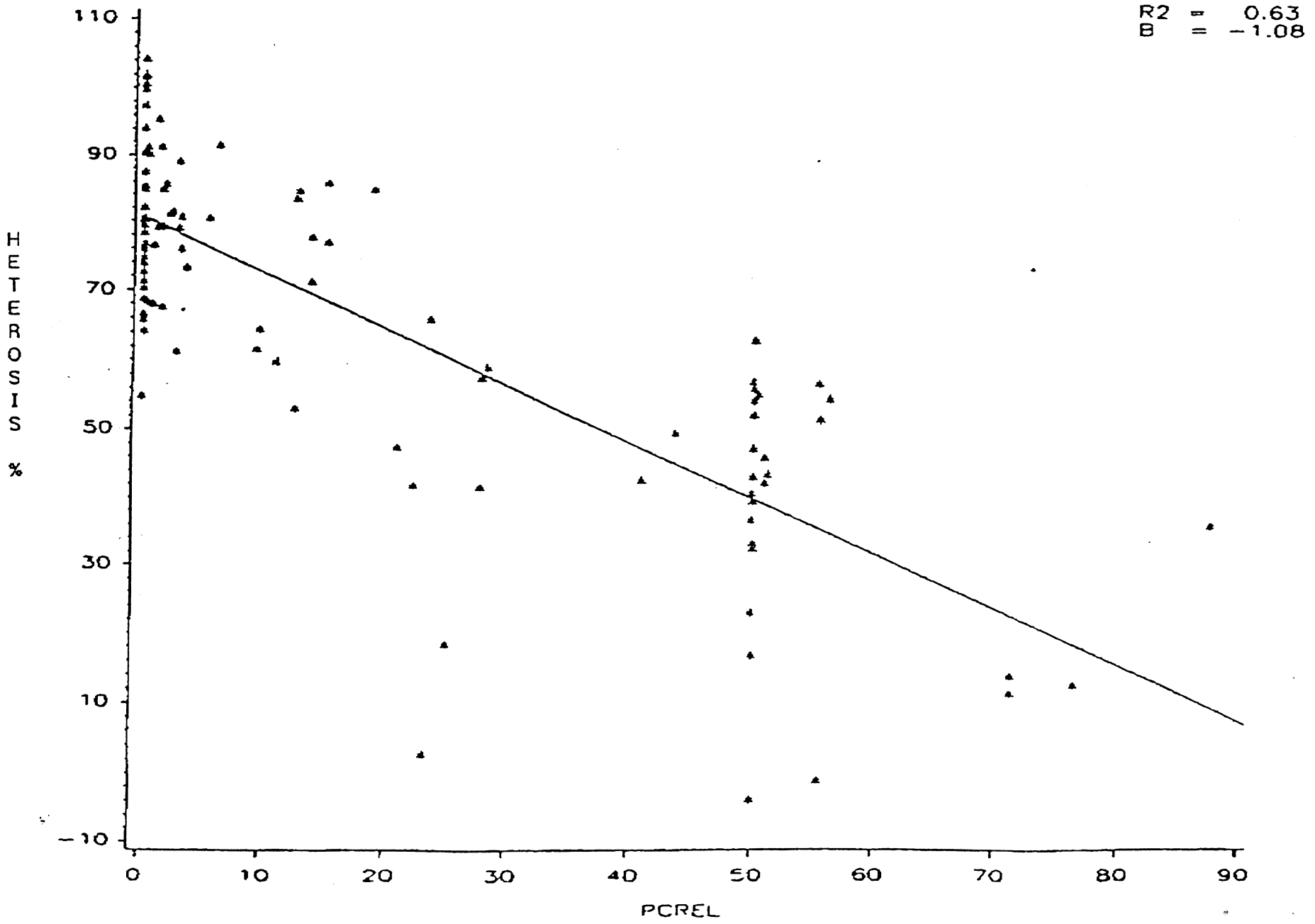
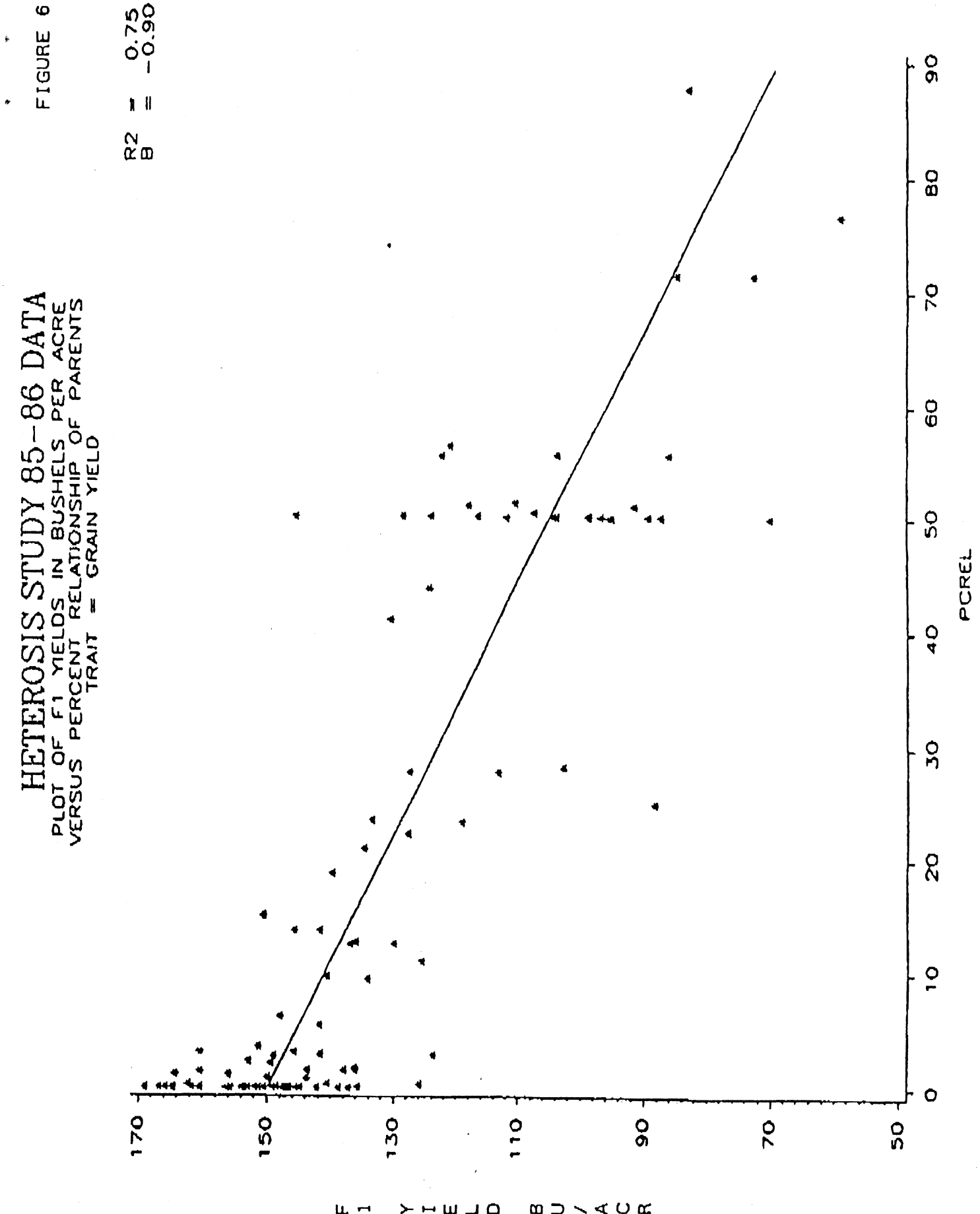


FIGURE 6



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