

INTERNATIONAL CONFERENCE
ON THE IMPROVEMENT AND ON THE
STANDARDIZATION OF VEGETABLE VARIETIES
AT WAGENINGEN, NETHERLANDS,
ON AUGUST 26 AND 27, 1955

O. BANGA

INTERNATIONAL CONFERENCE ON THE IMPROVEMENT
OF VEGETABLE VARIETIES AT WAGENINGEN,
NETHERLANDS, ON AUGUST 26 AND 27, 1955

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INTRODUCTION

Under the auspices of the XIVth International Horticultural Congress a special conference was held on two themes:

1. Principal trends in the development of new vegetable varieties.
2. Problems concerning the standardization and naming of vegetable varieties.

The conference was held at the Institute of Horticultural Plant Breeding at Wageningen, and was attended by some fifty people during the two days. Seventeen countries were represented.

Australia

D. A. JOHNSTON (36)
W. F. WALKER
J. C. WALSH (40)

Austria

F. PHILIPP (report only)

Belgium

A. LECRENIER (30)
V. E. TILKIN (23)

Canada

CHAS. WALKOF (18)

Denmark

M. BLANGSTRUP JØRGENSEN (56)
E. BLANKHOLM (58)

Egypt

A. MAHROUKI (20)
M. S. KHALIL
A. I. EL MURABAA
H. H. A. SELIM

France

R. FOURMONT (53)
L. FRIEDBERG (27)
G. TRÉBUCHET (57)

Germany

H. BASSE (43)
D. LAUX (28)
A. ROUX (33)
W. SCHUPHAN
F. v. WAVEREN (55)
MISS CH. ZORN (37)

Great Britain

J. C. HAIGH (41)
C. NORTH (54)

Japan

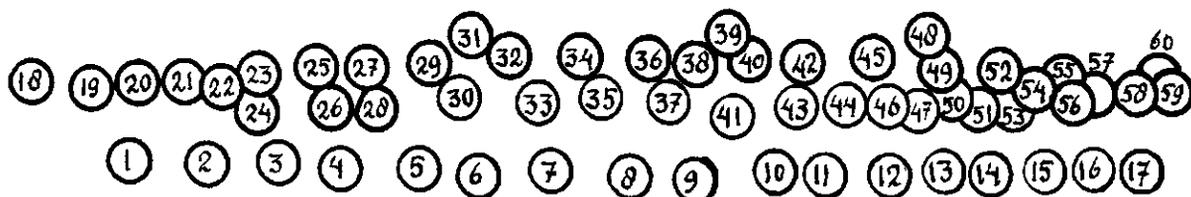
M. KAJIURA (report only)

New Zealand

MISS G. PRIESTLEY (12)

Netherlands

J. M. ANDEWEG (19)
O. BANGA (35)
A. M. P. A. BLOEMARTS
B. K. BOOM
J. P. BRAAK (50)
J. H. A. FERGUSON (42)
J. A. HUYSKES (31)
J. R. JENSMA (39)
KHO YAM OH (49)



Numbers in circles refer to participants' names mentioned in text. Not mentioned in text are:

- | | | |
|--|--------------------|---------------------|
| 1 Miss L. T. Banga | 7 Mrs. Blankholm | 13 Mrs. Smeets |
| 2 Mrs. Szteyn | 8 Mrs. Banga | 14 Mrs. Braak |
| 3 Mrs. North | 9 Mrs. Haigh | 15 Mrs. Huyskes |
| 4 Mrs. Miller | 10 Mrs. Veldhuyzen | 17 Miss W. Terpstra |
| 5 Mrs. Lammers | van Zanten | 24 Miss D. A. Banga |
| 6 Mrs. Andeweg | 11 Mrs. Meddens | |
| 48 Mr. W. Koopmans who acted as secretary of the conference. | | |
| 45 Mr. G. Berends who helped as an interpreter. | | |

MISS H. G. KRONENBERG (16)
 R. P. LAMMERS (52)
 J. J. MEDDENS (25)
 MISS M. C. H. V. D. MEULEN
 F. E. NIJDAM
 G. OUDEMANS
 MISS TH. F. S. M. VAN SCHAIK
 L. SMEETS (46)
 J. SNEEP (22)
 G. J. A. TERRA (44)
 R. TROOST
 N. VELDHUYZEN VAN ZANTEN (59)
 H. F. WATERSCHOOT (32)
 A. R. ZWAAN (29)
 A. E. ZEILINGA (51)

Norway
 A. R. PERSSON (26)

South-Africa
 A. J. V. D. MERWE (47)

Sweden
 H. LAMPRECHT (60)

U.S.A.
 J. C. MILLER (21)
 N. SLUIS (34)

Yugoslavia
 M. DOBREN OV
 S. PAVNOVIC (38)

Sixteen reports on theme 1 were forwarded; three on theme 2. With a few exceptions the reports were not read but only discussed. Here follows a summary of some of the main points of the reports and the discussions on theme 1. I hope to come back to theme 2 later. It is quite impossible to do justice to every part of each report or to every important remark that was made. But the reports will be published in detail in the Proceedings of the XIVth International Horticultural Congress.

EXPANSION OF VEGETABLE CONSUMPTION CALLS FOR EXTENSIVE BREEDING

In most parts of the world the consumption of vegetables still has a tendency to increase. Formerly the reason for eating vegetables was perhaps often mainly a negative one, for in many cases vegetables were eaten only because of an intentional rejection of food of animal origin, or an insufficient supply or relative expensiveness of such food. But since the knowledge of dietetic problems has increased, this reason has been turned into a positive one. Nowadays people wish to eat vegetables especially because of their specific food value.

In most cases this specific food value lies in trace elements, vitamins and possibly other concomitant dietetic factors, and in some cases also in main dietetic elements such as carbohydrates and proteins. In contrast to some countries having high vegetable consumption such as Japan, where vegetables represent up to 45 % of the food intake, there are others in which the authorities have come to the conclusion that too few vegetables are eaten.

For instance the population of Yugoslavia has increased by 17 % in the last 20 years, whereas the vegetable growing area has only increased by half a percent. Therefore, as diets are inclining towards a greater proportion of vegetables, a scheme for extending the production of vegetables has been drawn up.

In Norway the conclusion has also been reached that the consumption of vegetables is too low. People are becoming increasingly interested in vegetables. Consequently a big project aiming at an increase in the vegetable production, by 50 % for the time being, has been launched. In this project special plans are being worked out for northern Norway.

Since 1940 a big project for the extension of vegetable growing has been in progress in South-Africa.

Also in other countries the extension, improvement and especially improved adaptation to local conditions is being aimed at in vegetable production. And without exception the creation of suitable varieties plays an important part.

STANDARDIZATION OF VEGETABLE GROWING HAS ITS CONSEQUENCES

As long as local growers adapt their varieties to local preferences and food habits, there will be a great dispersion in the gene material used. Many different kinds and varieties reach the markets, and it seems to be a reasonable supposition that this will favour the availability of a wide range of additional food components. But several factors promote a tendency towards a standardization of the types and a reduction in the number of varieties used.

Originally, local vegetable growing near cities and towns dominated. But as soon

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as it became possible to ship fresh vegetables over great distances specialized centres with favourable growing conditions, sometimes rather far away from the consumption centres, very often got the leading positions. Therefore a greater need of pooling the product, standardizing the packing material, and consequently standardizing the varieties arose. It is well known how important shipping facilities have made the vegetable growing areas in the southern states of the U.S.A. In France a winter lettuce growing centre of about 5000 ha has developed at Perpignan. In this culture *Trocadero à graine noire* is the one variety used. The early tomato centres in North-Africa grow only the variety *Marmande*. The same general tendency of standardization is seen in countries such as the Netherlands and Italy, especially for their export of fresh vegetables.

Another factor in reducing the number of varieties used is the fact that there is more and more research on varieties and consequently more information on what are the best. Education of the growers helps a lot to make them more and more variety-minded, and to cause them to pick out the best. In some countries, like Germany, Austria and Yugoslavia, a restriction of the trade to acknowledged varieties is practised.

The French report mentions the decreased availability of labour in the kitchen. This is either because the housewives have a job outside the house, or because hired help is too expensive. This factor operates in many countries. It causes a greater use of processed vegetables produced in bulk somewhere, so mostly a standardized product again.

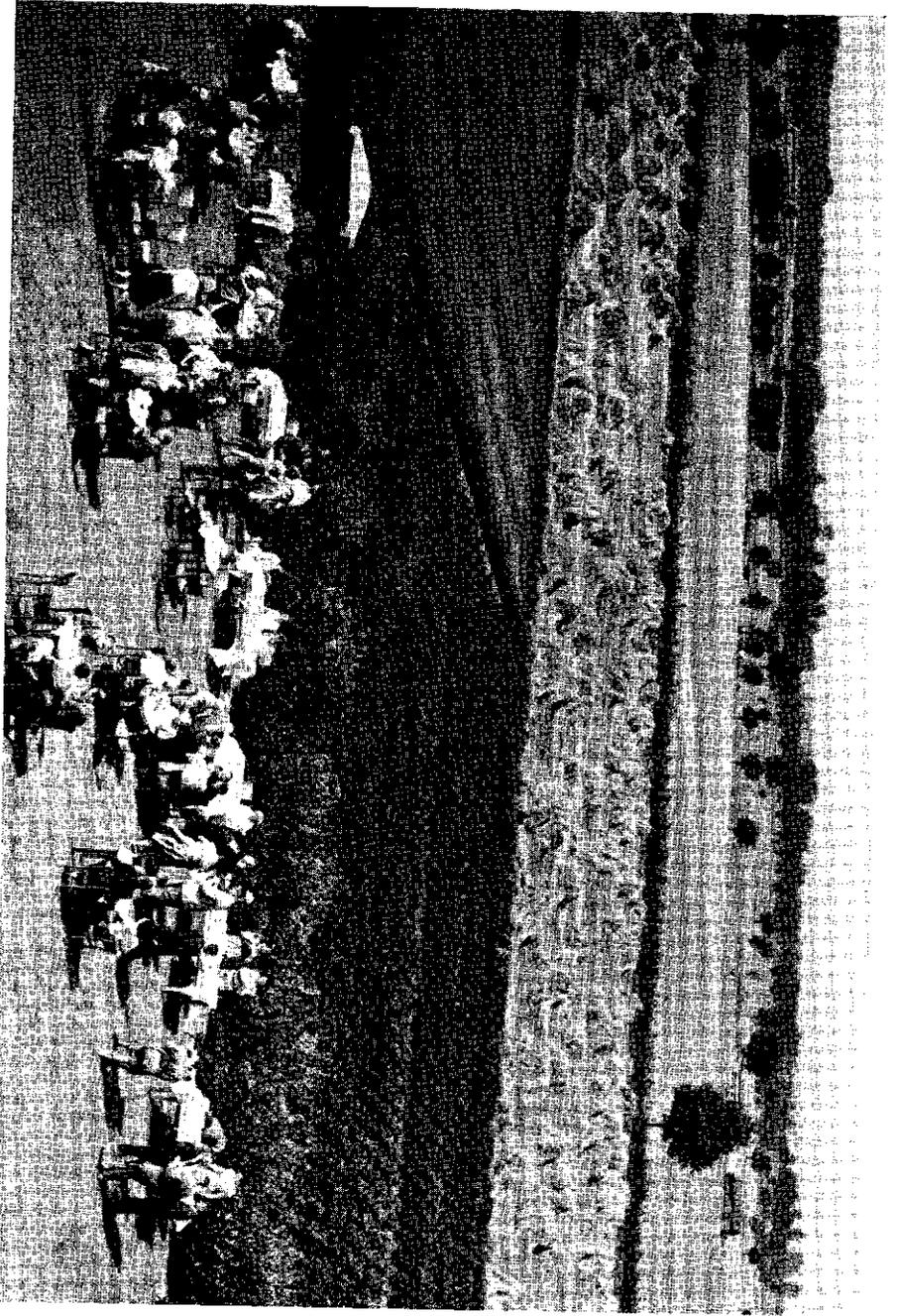
This standardization is economically unavoidable. But it means a narrowing of the gene material. And so far it has caused a domination of outside appearance over internal quality. This raises the question whether the plant breeder should introduce more concern for internal food value and taste in his planning.

ADAPTATION TO FOOD HABITS AND CONSUMERS PREFERENCES

Food habits and consumers preferences are the first directives for every vegetable breeder. They may greatly vary with countries or even with areas. The English prefer large peas and small tomatoes whereas the French favour small peas and large tomatoes. In the U.S.A., Canada and Australia consumer preference is more and more for small-headed cabbage varieties; in many other countries large-headed varieties are still popular for certain purposes.

In Egypt the methods of cooking and the ways of eating vegetables such as cabbage, carrots, radish and sweet potatoes differ from those used in many other countries. Because cabbage leaves are eaten stuffed with rice and meat they have to be thin and the head must not be too compact. Carrots are eaten raw or processed as jams. The local variety has small purple roots which are sweet and tender, but poor in carotene content.

Breeding programmes aim at increasing the carotene content of this carrot without too much sacrifice of the other popular characters. Leaves of the local variety of radish are tender and soft and are eaten raw. Any improvement in the radish should not do away with this merit. Sweet potatoes are eaten baked, a method that requires firm flesh. Sweet potatoes that are rich in carotene generally have soft flesh and thus are not suitable for baking. This example from the Egyptian report proves that a good



BUFFET LUNCH ON THE LAWN. THE LUNCH WAS PREPARED BY WIVES AND DAUGHTERS OF PARTICIPANTS

knowledge of the food habits in different countries and areas is very necessary for a plant breeder to meet with success.

Consumers preferences may be very persistent. In many of the so-called „poorer“ districts in England for example, the staple vegetables for the months of February, March and April are savoys and swedes, because 30 years ago they were the only cheap vegetables available. To-day the demand has changed little, despite the availability of more attractive vegetables at competitive prices and a considerable increase of the incomes and an improvement in the standard of living of the inhabitants of such districts. There are signs of such a change but as yet it has had little effect. When in the Netherlands A. R. ZWAAN introduced his new radish variety *Cherry Belle*, which is very resistant to sponginess, he showed some vegetable-retailers that his new radish might grow very large without becoming spongy. He invited them to sell these large-grown radishes to the public, just to show that they still were good. The retailers admitted that sponginess was absent, but they did not dare to sell the radishes. They said: the house-wives believe that a large-sized radish must be spongy, so we should lose our goodwill if we sold them. Thanks to the publication of the results of variety-research and to the extension service, the vegetable growers now grow this variety and the public has the benefit of its sponginess-resistance without knowing it; for it is harvested at the same size, of course, as the established varieties.

Many cases, however, are reported in which the public has accepted varieties with better qualities if these are easily perceived. Among these are fleshy French beans, highly coloured carrots of a good shape, cucumbers that will not become bitter, well-coloured tomatoes, etc. In Japan in squash, tomato and watermelon this better adaptation to consumers preferences has been reached by the use of hybrid varieties; e.g. seedless watermelons are being produced by means of hybrids between tetraploid and diploid varieties.

INTERNAL QUALITY

MISS TH. F. S. M. VAN SCHAİK delivered a speech on the importance of those food qualities of vegetables which are not easily perceived and PROF. G. J. A. TERRA stated some cases, experienced in Indonesia, in which the internal food value is an interesting factor. He said that Indonesian lettuce has a rather loose head and consequently might, at first sight, be rejected according to the European and American standards of compactly heading varieties. It turned out, however, that its vitamin C content was double that of the ordinary European varieties. So the Indonesian type was to be preferred from the standpoint of the food scientist. Yellow fleshed sweet potatoes are better than white fleshed, because of their higher vitamin content. Here the inside colour indicates a more useful type, but outside colour is not of any importance. He also pointed out that in countries where the increase in animal protein production is difficult, the breeding of vegetables with a high protein content may be worth trying, e.g. in plants like *Euphorbia pulcherrima*, *Sauropus androgynus*, *Manihot utilissima*, *Jatropha cureas*, and *Codiaeum variegatum*.

A high protein content alone would not be sufficient. Selection should also be made for a suitable proportion of the amino-acids that meets the human need.

DR. J. C. MILLER from Louisiana (U.S.A.) told of his breeding work with sweet potatoes and said that the carotene content of the same variety may greatly vary with



DISCUSSIO

different areas. DR. H. LAMPRECHT from Sweden confirmed the modifying influence of the growth conditions. Swedish experience has learned that the best quality of fruits, potatoes and vegetables is obtained in the northern part of the country. MR. F. VAN WAVEREN from Germany said that the quality of peas, and also of other kinds of vegetables, may vary widely with the countries where they are grown.

Everybody agreed that internal food quality and taste are important characters in vegetable varieties. For commercial plant breeders, however, it will not be easy to make efficient projects in this direction, for thusfar the public has not paid for favourable characters which cannot easily be seen. So here seems to be a task for state institutions.

In this connection it is very interesting that Denmark is preparing a basis of variety evaluation and chemical analysis that may possibly lead to certification of certain varieties for a high vitamin content.

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PROGRESS

ADAPTATIONS TO NORTHERN REGIONS

Fifteen years ago country residents in the Prairie Provinces of Canada found it difficult to maintain a well-balanced diet with their limited range of vegetables. Available varieties were not adapted and failed to produce a satisfactory crop.

These areas are characterised by a short frost-free growing period (June 15 to the end of August). To meet this situation several very early maturing varieties have been bred, and more are coming.

The *Meteor* tomato is an example of a new, low growing, determinate, early ripening, large-fruited tomato variety that has practically replaced the indeterminate *Earliana* variety in the Prairie Provinces. Because of its small plant size and its limited foliage cover, early fruit setting and ripening are promoted. Another advantage of its dwarf character is that it will not easily be damaged by strong winds.

A further improvement has been realized by the development of a determinate type of tomato with short internodes between branches growing from a strong main stem. The flower clusters are usually in pairs and those nearest to the main stems set the greatest amount of fruit. As a result, the fruit of the plant is centrally located and held off the ground by the main stem. This prevents the fruits from being spoilt. There is also considerable interest for frost resistant tomatoes. *Lycopersicum peruvianum* has demonstrated marked frost resistance. This species has been crossed with varieties of *L. esculentum* in order to develop frost-resistant tomatoes suitable for field planting in May.

Tiny Tim pea (9–10 inches tall) is replacing *Wisconsin Early Sweet* and *Alaska* as garden varieties. *Selkirk* and *Arctic Sweet* are very early garden peas of high quality that are expected to replace the standard varieties *Little Marvel* and *Homesteader*. *Selkirk* is drought resistant.

Morden Midget is a dwarf cabbage (10 inches tall, heads 1½–2 pounds) of excellent quality, resistant to bursting of the heads in spite of ample soil moisture. When available it is expected to replace the larger-headed and easily bursting varieties *Golden Acre* and *Jersey Wakefield*.

Other important varieties for short season localities are the dwarf sweet pepper *Morgold*, the early *Morden Early* cucumber, and the early, high quality sweet corn varieties *Altgold* and *Dorimmy*.

Norway has problems similar to those which Canada has in its Prairie Provinces. It is unique because the warm Gulf stream enables an intensive plant production farther north than in any other place in the world. The growing season is short, the temperature rather low, and, especially in the extreme north, the day is very long. In the northern part of the country there is a continuous day, in the southern part the day length is maximally 20 hours. Also the altitude of the growing districts may be very different; it varies from about sea-level in the coastal area to 4–600 m above sea-level.



For the northern parts of the country the development of better adapted varieties of red beets, leek, celeriac, sugar peas and cabbage is important. It is planned first to test a great many varieties in northern Norway and then to start breeding work with the best adapted material.

The northern part of Sweden lacks the influence of the warm Gulf stream. Therefore, its suitability for the growth of vegetables is less than that of the corresponding parts of Norway. For those northern regions where vegetables are grown, *Argus* is a specially adapted white cabbage variety. It ripens before the *Amager* strains.

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ADAPTATION TO SUB-TROPICAL CONDITIONS

In great parts of Australia and South-Africa many varieties from the southern states of U.S.A. appear rather well adapted. The same applies to Egypt and probably to most sub-tropical countries or areas. Disease resistance is not always the same as in the U.S.A.

Sub-tropical conditions imply a relatively short day length, a hot summer and a very mild winter without frost. Therefore cool season crops can only be grown during the winter time (autumn, winter, spring). In South-Africa the Lowveld of the Transvaal is a winter production area. In Australia extensive frost-free areas in Queensland enable this



state to produce tender vegetables during the winter, largely for export to southern states. In many places warm season crops can be grown during the summer.

All three countries report breeding work aiming at a greater adaptation to different ecological conditions, or at combining available ecological adaptation with other characters.

In Egypt the bright sunshine and the excessive heat during the summer brought the problem of affording enough shade to tomato fruits on the increasingly popular determinate type plants to the fore. This problem is being solved by incorporating the gene for potato leaf in all the newly introduced tomato varieties.

In Japan ecologically adapted varieties were bred in cabbage, carrot, Chinese cabbage, cucumber, onion, strawberry and tomato. In many cases F_1 hybrids proved very useful to realize this purpose.

ADAPTATION TO ECOLOGICAL CONDITIONS IN TEMPERATE ZONES

Adaptation of cool-season crops to summer heat and drought is one of the objectives. In France experience has shown that light coloured lettuce types like *Attraction* (White Boston) do not grow well in the mediterranean area where the summers are hot. The green varieties like *Tête de Nimes* and *Madrilène* are much more adapted to this climate.

The French report says that those who get used to the green varieties end by preferring them. In Germany *Futura* is a new summer lettuce variety which distinguishes itself by heat resistance.

In the Netherlands a project to breed a more heat and drought resistant summer cauliflower is under way.

A second item is the adaptation of warm season crops to cool summer temperatures. The Belgian report emphasizes the desirability of more cold resistance in open air



tomatoes. In Denmark the open air cucumbers are being made more resistant to cold and wet weather.

In the Netherlands with its long growing season the adaptation of varieties of crops like endive to the cold, wet, light deficient autumn

weather is important. Also frost resistance in winter open air crops like Brussels sprouts and kale is aimed at.

Apart from areas influenced by the Gulf Stream (like S.W. England and Wales) the British climate is too cold for the production of cauliflower heads in January and February; consequently an entirely different group of varieties is grown in these favoured areas. As the climate of these districts is also favourable for the development of Ring Spot (*Mycosphaerella brassicicola*) such varieties must be resistant to this disease.

In the temperate zones glasshouse culture during the winter is very frequent. As the natural light conditions are poor then, adaptation of varieties to short, light-deficient days is desirable. In England hybrid tomatoes with the ability to flower and fruit in winter are being developed. In Sweden the *Cavallius* spinach was created; it grows very well under glass in the short winter days. In the Netherlands projects to breed better adapted tomatoes, spinach and cauliflower are under way. From the lettuce variety *Blackpool* a strain that can grow under very poor light conditions has been selected.

DISEASE RESISTANCE

In most breeding programmes the breeding of disease-resistant varieties is a very important objective. Phenomena like the occurrence of different biotypes of fungi or the fluctuation in resistance under different ecological conditions tend to increase the work.

It would take too much space here to mention all the projects under way. They can be found in the reports. Here only a summary of some of the newly developed disease-resistant varieties is given.

Beans	Germany	Colletotrichum	Schreibers Resista Wachs
		Mosaic virus 1	Gebr. Dippes Wachs Quitlinga Haubners Rekord " Olympia } pole " Mansf. Gold } beans " Wachs Goldr. }
		Resistant to Colletotrichum and little susceptible to mosaic virus 1 and 2, and tobacco virus 11	Schreibers Imuna " Longimuna " Grandimuna "

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Beans	Netherlands	Mosaic virus 1	Fruca Furore Voorluk Servus Widusa Aromata Combine Romore	} pole beans
	Sweden	Colletotrichum	Drabant (wax)	
	U.S.A.	Mosaic virus 1	Contender Full Measure Hi-Score Impr. Tendergreen Processor Rival Topcross Topmost Wade	
Peas	France	Fusarium wilt	Clause 50	
	Germany	Fusarium wilt and Top yellows	Breustedts Ceres v. Waverens Juwel	
	Netherlands	Top yellows Fusarium wilt + Top yellows	Rondo Vares	
	U.S.A.	Fusarium wilt	All recently introduced new varieties.	
Tomato	Canada	Cladosporium fulvum	Vagabond Vulcan	
	England	" "	Ware Cross (hybr. var.)	
	Netherlands	" "	Single Cross (hybr. var.)	
	Sweden	" "	Danderyd: Weibulls Immuna	
Cucumber	Netherlands	Cladosporium cucumerinum	Vios Mabro Amato Proso Esvier	
	Sweden	Erisyphe cichoracearum	Favör	
Cabbage	Japan	Mosaic	Shimoyama-Chitose	
	U.S.A.	Yellows	Many varieties	
Spinach	Netherlands	Blight	Presto	
	U.S.A.	Blight Peronospora spinaciae	Many varieties Hybrid no 7	

Radish	Japan	Mosaic	Tahakura Hayafutori-Nerima
Watermelon	Japan	Anthracoise	7 Hybrid varieties.

ADAPTATION TO PRODUCTION TYPES AND HARVESTING TECHNIQUES

Where ecological conditions cause a short growing season (summer culture in northern regions, winter culture in sub-tropical regions) early maturing varieties are wanted. Also marketing conditions may stimulate the breeding of early varieties. This is the case with kohlrabi, tomatoes and cabbage in Germany, with beans, onions, radishes, cabbages and red beets in Austria and with tomatoes, slicing cucumbers, broad beans, and many other crops in the Netherlands. In some crops different degrees of earliness are wanted for the possibility of successive harvest times, e.g. for canning peas in many countries, and for witloof in Belgium, France, and the Netherlands. For some crops it is preferred to use one variety and to get successive harvesting times by successive sowings. A combination of earliness and high productivity is wanted very much. Japan has reached this in cabbage types by breeding hybrid varieties.

Peas are more and more used as a canned product. In most countries the use of tall types of peas is therefore decreasing and the use of dwarf types fit for growing in large plots that are mechanically harvested is increasing. The demand is for a series of successively ripening varieties of dwarf peas with firm stems and simultaneously ripening pods. And they should combine the productivity of the old agronomic types with the quality of the old market gardeners types. As French beans are also important for canning, the same tendency exists with this plant.

Breeding spinach varieties with more or less erect leaves for mechanical mowing is becoming more and more important (e.g. U.S.A., Sweden).

Large plots of crops like cabbage and lettuce are fit for harvesting with the use of a conveyer belt. The plants are cut or picked by hand, and put on the belt. The conveyer belt is moved over the fields. The produce is packed and put on a truck. The rubbish is left in the field (e.g. southern states of U.S.A.).



In most countries the long types of red garden beet have been or are being replaced by round types because of easier harvesting and shorter growing season. In a deep soil of good structure the productivity of carrots is practically proportional to the length of the carrot, but because of difficulties with long types when lifting and transporting them, medium long types are preferred. In Denmark the roots of scorzonera are made shorter and more blunt. A certain amount of mechanical harvesting of root crops is

practised by the use of ploughs or plant lifters, but that does not call for much difference in the varieties.

A market gardener may prefer a variety in which the individual plants ripen successively, in order to be able to sell his product gradually. But when the plants are grown in large plots for simultaneous harvesting, uniformity of the varieties is very much needed.

For heterogamous plants the breeding of hybrid varieties is a powerful means to reach this purpose. U.S.A., Japan and Canada have achieved important results in this field (e.g. in onions, cabbage, cucumbers, sweet corn, watermelon, etc.). In several other countries a lot of breeding work for the production of hybrid varieties is being done too. It may be expected, therefore, that the number of hybrid varieties will steadily increase.

ADAPTATION TO STORAGE, HANDLING, TRANSPORTATION, AND PROCESSING DEMANDS

Storage of fresh vegetables plays an important role in countries with a relatively long winter, that is in the northern countries. But also in countries in the latitude of England, Netherlands, Denmark and Germany, much selection for keeping quality has been and is being done. The most frequently stored vegetables are cabbage, root crops and onions.

Winter storage is made less important by the improvement of transportation, canning and deep-freezing possibilities, as well as by glasshouse culture.

Resistance to handling and transportation is quite a different thing from keeping quality. Protection of the edible part by outer leaves (cauliflower), scales (onion) or skin (potatoes) is important. Another way of improving the resistance to transportation is to make the tissues tougher. This may or may not decrease the internal quality of the vegetables. As DR. WALKOF said: if one works on the adaptation of varieties to transportation purposes, there is a tendency to forget about other purposes including internal quality. But that does not imply that this can not be adjusted afterwards.

The members of the conference were generally of the opinion that a combination of resistance to transportation and a reasonable internal quality is quite possible in most cases.

Most peas are canned. In many countries a lot of work is done to develop new pea varieties in which productivity is combined with good quality for processing.

Many tomatoes are canned also, either as purée or as juice, but especially in areas where they can be grown in the open air. Japan reports two new varieties for this purpose: *Sakae no 1*, retaining 50 % of raw material as purée, and *Sinano-scarlet*, retaining 45 %, but retaining good colour. In Canada, *Geneva John Baer* is the leading variety for commercial canning in the provinces of Quebec and Ontario, but it has several weaknesses, and new improved varieties are anticipated. *Clark's Early* is a standard in British Columbia. In the Mediterranean area (France, Italy) a lot of canning tomatoes are grown.

Among the other crops that are canned are carrots, asparagus, sweet corn and French beans. In Europe the bean variety *Double Dutch Princess* (Stringless Double White) is considered to have the best quality. SCHREIBER in Germany has bred *Imuna* and *Longimuna* which also are popular for canning.

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In the U.S.A. the freezing industry each year sees a big increase, and the same is true for many other countries. In Norway the frozen fish industry has a freeze link all over the country and every grocer already has a freeze dish. This offers great possibilities for the use of frozen vegetables. In Sweden they used to grow spinach in glasshouses and frames. But since the development of the deep freeze industry, the early glasshouse product has been replaced by frozen open air spinach, because this is cheaper. They use the varieties *Viking* for overwintering in the open in southern Sweden, and *Viking II* for sowing in spring and summer.

Among the frozen vegetables are peas, beans, spinach, Brussels sprouts, cauliflower, and green sprouting broccoli. In Canada it has been found that green sprouting broccoli, after being frozen and then cooked, has a tendency to become soft and under certain conditions it may get a slimy texture.

Therefore they are now beginning to show a preference for the purple cauliflower in place of the sprouting broccoli for freezing purposes. It does not become soft or slimy after cooking and the purple colour disappears.

A general conclusion from the discussion on freezing vegetables was that breeding work for this purpose will become more and more important.

SUMMARY

A summary is given of the reports and discussions of the international conference on principal trends in the development of new vegetable varieties, at Wageningen, Netherlands, on August 26, 1955. This conference was attended by some fifty representatives of seventeen countries. The discussions included the following items: adaptation to food habits and consumers preferences, to ecological conditions, to disease resistance, to production types and harvesting techniques, and to handling, transportation, storage, and processing requirements. The exchange of facts and ideas was very fruitful. It was agreed to keep in touch with each other and hold a meeting of this kind at every future International Horticultural Congress.

SAMENVATTING

Internationale Conferentie over de ontwikkeling van nieuwe groenterassen te Wageningen op 26-27 augustus 1955

Een samenvatting wordt gegeven van de rapporten en discussies van de internationale conferentie over de voornaamste tendenzen in de ontwikkeling van nieuwe groenterassen, gehouden op 26 augustus 1955 te Wageningen.

Deze conferentie werd bijgewoond door ongeveer 50 vertegenwoordigers van zeventien landen. De discussies omvatten de volgende punten: aanpassing der rassen aan voedingsgewoonten en aan de voorkeur van gebruikers, aan ecologische omstandigheden, ziekte-resistentie, productie typen en oogstmethodes; verder aan eisen t.a.v. behandeling, vervoer, bewaring en verwerking.

De uitwisseling van feiten en ideeën was zeer vruchtbaar. Men kwam overeen met elkaar in contact te blijven en bij elk toekomstig Internationaal Tuinbouwcongres weer bijeen te komen.

INTERNATIONAL CONFERENCE ON THE
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VARIETIES AT WAGENINGEN, NETHERLANDS,
ON AUGUST 27, 1955

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INTRODUCTION

A summary of the reports and discussions of the first day of the International Conference of August 26 and 27, 1955, at Wageningen, was given in *Euphytica* 5 (1956): 18-32. Here follows a summary of the reports and discussions of the second day.

There were seven theses as a basis for the discussions, and three reports. Mr. NINNIN, Brétigny, France, sent a 'Brief exposition in relation to theme II'. He was prevented from being at the conference himself, but was represented by Mr. L. FRIEDBERG. Parts of his 'exposition' have been incorporated in the following summary. Mr. R. FOURMONT, Station d'Amélioration des Plantes, Versailles, France, presented 'Some observations on the identification of varieties and strains of autogamous vegetable plants'. The third report is my introduction to the seven theses. The full reports will be found in the proceedings of the XIVth International Horticultural Congress.

This is not a literal representation of the discussions. I have tried to give the meaning of the speakers as neatly as possible, but I am aware that misunderstandings in a difficult field like this are quite easy. Therefore, I beg that speakers will send me corrections if I have made mistakes. I have made comments where I thought it desirable to explain the meaning of the theses.

THESIS 1

Extension of knowledge and handling of legal problems in relation to varieties is possible only if there is a generally accepted conception of what a variety is.

Mr. NINNIN (France) stressed this point in his report. The ASSINSEL (International Association of Plant Breeders) favours the filing of new varieties in official registers in the different countries as a basis for the protection of the plant breeders work. But if these registers are to be reciprocally acceptable, there must be an international understanding of what should be considered as a variety.

Mr. BASSE (Germany) said that in Germany a seed-law is working now that opens the possibility of registering new individual varieties. A variety is accepted as individual if, at the moment the application for registration is filed, it is sufficiently distinguishable from all varieties that are in the trade or have been filed for registration already. It leaves to the official experts to decide what will be 'sufficiently distinguishable'. Therefore the question what kind of difference will do to define an individual variety is an urgent one in Germany.

During the discussions it appeared that also in countries where there is no legislation in relation to varieties, it is felt to be quite desirable to have some kind of manageable system for the standardization and the naming of varieties. Legal consequences will complicate the problem, but will not essentially change it.

THESIS 2

In defining what a variety is, one should start from the statement that for plant production purposes one has to distinguish between units for agricultural use.

Prof. DOBREN OV (Yugo-Slavia) said that varieties in an agricultural sense should not be confused with botanical taxons.

Dr. BOOM (Netherlands) remarked that the International Code of Nomenclature for Cultivated Plants has quite accepted this idea. If it uses the term variety it means cultivated variety or cultivar, which is entirely different from the botanical variety.

The conference agreed on this point. We have to consider units for agricultural use, not botanical units. This implies that botanical methods used for the identification of those units should be guided by the agricultural purpose.

THESIS 3

Distinguishing one unit from another is possible only if the units are identifiable. This is possible only if the units differ in one or more characters which are

- a) *sufficiently contrasting, and*
- b) *reproducible in successive generations.*

Mr. NINNIN (France) states that the identification of varieties has become more and more difficult during the last fifty years because the gaps between varieties have been filled up by a great number of intermediate types. Clear differences have been replaced in many cases by a continuous variation. It would be useful to recover, by studying the seed catalogues of seed companies, the original basic varieties. In describing them, all smaller differences that have come into existence after the original introduction, should be renounced. Experts and committees (private and official) should work until a complete agreement on their definition and naming is reached. They should be easily identifiable by one or more stable characters, without any danger of confusion. New varieties should be added to the list only if they could be distinguished from the earlier established varieties without any hesitation or contradiction. Non-identifiable units within or too near a well-defined variety should be denied a place among the varieties. They should be classified as strains or selections. They should be introduced and sold under the name of the nearest basic variety, possibly in some cases with the name of the seed company or a fancy name following.

Mr. BASSE (Germany) says that in Germany the opinion is that two units can only be accepted as different varieties if the difference manifests itself under all conditions of growth and culture. The pea varieties Douce Provence and Petit Provençal are not considered as different varieties for the differences are evident under certain conditions only. They are taken together as one variety, that is called Kleine Rheinländerin in Germany.

Kleine Rheinländerin is an old variety that is not the exclusive property of one breeder, a so called free variety. New units filed for registration are treated in a somewhat different way.

Free varieties cannot be inspected as well as the registered varieties that are under individual control. If a breeder does not maintain his registered variety exactly as it was when registered he will lose his right to sell seed of it. Therefore smaller differences are acceptable.

As experience had learned that a seed company does not always sell the same strain of a free variety, the German authorities are inclined to promote a development in which the free varieties will gradually disappear from the trade.

Mr. R. FOURMONT (France), restricting himself to autogamous plants (especially peas), makes a difference between primary and secondary characters. To be called primary a character should be contrasting and stable. Those characters that are not quite spectacular and contrasting, are called secondary.

Mr. FOURMONT considers as synonyms: two or more varieties which cannot be separated by any distinct and stable character, e.g. Pois des Serpettes and Vlijmse Krombek. He does not agree with the exclusion of small but stable and contrasting differences, but rejects non-contrasting differences as a means of separating varieties. According to the number of primary and secondary characters in which two units show a difference he gives the following definitions:

A 'strain' of an autogamous variety is a unit that differs from that variety in one or maximally two secondary characters.

'Similar varieties' (variétés affines) are units that differ in a small number of stable secondary characters only (3 or 4), e.g. Petit Provençal (Eminent) and Douce Provence. The latter has a higher growth rate, is more frequently two-podded, and has bracts at the base of the flowers.

'Approaching varieties' (variétés voisines) are units that differ in one primary and one or two secondary characters, e.g. Nain très hâif d'Annonay and Cheminlong. They differ in the first fertile node (primary character), in plant height and leaf morphology (secondary characters).

Acknowledging a unit as a new individual variety should be possible only in cases of several clear differences, including the cases of similar and approaching varieties.

Mr. FRIEDBERG (France) and Mr. TRÉBUCHET (France) have another opinion. If the problem arises to decide if two units must be considered as two individual varieties or not, one has to ask in the first place if there is any difference in agricultural use. If there is such a difference, then one tries to find the proper characters to distinguish them. As Mr. NINNIN said, the difference should be clear, leaving no chance of confusion, but the agricultural value of a difference is more important than the number of differing characters.

Dr. WALKOF (Canada) says that in Canada there is an understanding among the vegetable breeders in regard to what should be called a variety and what a strain. Two varieties must be distinguishable in more than one character; if a new unit is distinguishable only in one character it is a strain of the old variety. If, as an example, a plant breeder has been working with the tomato variety Ailsa Craig and in 1955 he finds a variation in one character, he may introduce that type as a new strain and call it Ailsa Craig strain 55, indicating the year when he first observed it.

Mr. FRIEDBERG (France) can agree with this system. However, the first year of observation is not known for all strains. It was proposed somewhere to indicate such strains, if there are more than one, by the numbers I, II, III, etc., but this would be against the nomenclature rules. It would seem preferable, in a case like that, to indicate the strains with the name of the variety followed by a fancy name.

Dr. MILLER (U.S.A.) says that in the U.S.A. the minor differences are also called strains.

Dr. VAN DER MERWE (South Africa) gives an example of what was done in South Africa. They selected a line out of the onion variety Texas Grano, that was 3 weeks earlier and had a somewhat smaller bulb. They called it Pretoria Grano, to indicate the affinity to Texas Grano.

Mr. NINNIN (France) had recommended a great deal of caution in accepting differences in cultural value or disease resistance as a basis of differentiating varieties, because it would make identification very difficult. He prefers the classification of units that differ in such characters as strains or selections.

Mr. LECRENIER (Belgium) says that thus far morphological differences have been investigated and proved useful as a means of classifying varieties. But a further development might be possible by using well devised physiological methods, as is considered at this institute. Differences in cultural behaviour as such should not be accepted for differentiating varieties, unless they might be defined in terms of clear, reproducible physiological differences.

Dr. NIJDAM (Netherlands) asks, if a new variety of an autogamous plant should be a pure line to be fit for registering, or should a mixture of pure lines also be accepted.

Mr. FRIEDBERG (France) thinks this is a question of legislation which may be different in different countries. In some countries, for example in France, it must be a pure line.

Dr. LAMPRECHT (Sweden) says that in Sweden one or two percent deviating types in a new variety are accepted.

In conclusion it can be said that there was general agreement that a unit for agricultural use should be acknowledged as a variety only if it can be distinguished from other varieties without confusion, that means by clearly contrasting, stable differences.

Many members of the conference were of the opinion that a new unit derived from a variety of an autogamous plant, but differing from it only in a small degree (e.g. by one contrasting character, or by some non-contrasting characters, etc.), should not be called a new variety, but a strain from the original variety. Herewith the answer to thesis 6 has been given. This thesis was formulated as follows:

In the group of autogamous plants similar types may be found that differ only in one or two of the minor morphological characters, being equal in all the other morphological characters and in all cultural characters. If it can be avoided such similar types should not be acknowledged as distinct varieties.

There was not quite a definite opinion on the acceptability of physiological differences. But if for instance one lettuce plant bolts in a short day as well as in a long day, whereas another plant will bolt in a long day only, this clear physiological difference seems to be a safe basis for identification. It seems to the author of this article that the same may be said of a really contrasting difference in disease resistance.

THESIS 4

To be fit for the name 'variety' a group of plants should be identifiable in compliance with thesis 3. This implies that in general a variety of an autogamous plant can be much more accurately defined than a variety of a heterogamous plant. Indeed, very often a variety of a heterogamous plant is a basic unit only, within which a considerable degree of variation of non-contrasting and non-stable characters may exist.

As there was little discussion on this thesis, I should like to comment upon it as follows:

Two things should be kept apart:

1. *A difference between two homozygous units*, as is the case with well selected material of well established varieties of an autogamous plant like peas. Such a difference is stable at reproduction.

Differences between two homozygous units may show different degrees of distinctness; nevertheless they will be present in the progenies of the two units just as they were in the previous generations. Therefore in principle it is possible to identify them, however difficult it may be. And it is only a question of convenience or of agricultural interest if smaller or non-contrasting differences will be accepted as a basis for the acknowledgement of separate varieties or not. By reading the different arguments used in the discussion of thesis 3 one will recognize these two factors in different proportions.

The degree of distinctness of a difference depends on:

a. The degree of contrast between characters (discontinuously varying characters are the most contrasting).

b. In the case of continuously varying characters on the largeness of the difference, and on the degree of fluctuation of the characters under different conditions.

c. The number of the differences.

2. *A difference between two heterozygous units*. Such a difference is not stable at reproduction.

In a unit of a heterogamous plant there usually is a kind of frame-work of stable, homozygous characters, completed by a larger or smaller number of heterozygous characters. Only the stable framework can be used for classification and identification purposes.

That means that within a unit of identification of a heterogamous plant may be several units of a somewhat differing agricultural value, this difference in agricultural value depending on the ecological conditions under which the maintenance-selection was done (varying from year to year), on the ideas of the man who did the selection, and on the intensity of his work.

In compliance with thesis 3, it is only the unit of identification that can be called a variety. But as this is only the stable framework, that means in most cases only an abstraction, a part of any living unit, I felt the necessity to devaluate the name variety somewhat in this case by the facultative addition of the word basic. If a grower buys seed of the carrot variety Chantenay, it is not enough that he knows that it is the Chantenay variety indeed, but it is very important for him if it is a good selection of Chantenay.

The agricultural units within a 'basic' variety are here called selections. The selections are not properly identifiable because they are not quite stable. For the rest the same viewpoints as mentioned under 1 are applicable to the stable characters of the 'basic' varieties.

It should be remarked here that Mr. NINNIN used the word basic variety (*variété de base*) not quite in the same sense as I did, but more to indicate an original, principal variety.

Concluding, it may be said that the limitations in the acknowledgement of individual varieties are essentially concerned:

- a. in autogamous plants with one factor: the degree of distinctness of the differences;
- b. in heterogamous plants with two factors: the stability of the differences, and the degree of distinctness of the stable differences.

THESES 5

Considering that only identifiable units for agricultural use should be called varieties, there remain non-identifiable units for agricultural use which may play a very important role in plant production because of differences in cultural value.

These are:

- a. *Selections within a variety. In general these selections should bear the name of the variety (as a basic unit) accompanied by the name of the breeder, or some sort of a trade word standing for the breeder's name.
A highly improved selection of a variety that is improved only in a non-contrasting character, so that it cannot be identified as a distinct new variety, might bear the name of the old variety with the addition of the word improved or of another appropriate word.*
- b. *Hybrid varieties, i.e. all kinds of non-stable compositions of varieties or selections.*

The discussions on this point were not quite clear. As a consequence it is very difficult to formulate the feelings of the participants as well defined opinions. Therefore I will try to summarize the different aspects in a few words.

In the first place I believe there was little divergence of opinion that a stable unit that differs in a small way only from another stable unit should be called a strain from the first unit, in heterogamous plants as well as in autogamous plants. A strain is essentially identifiable.

In the second place it is clear, that the non-identifiable units within a 'basic' variety of a heterogamous plant are in a different position, as has been explained above. They are indicated here as selections.

There are two difficulties:

1. To take an example, the trade distinguishes three varieties of Langendijker Red Cabbage: Early Red, Autumn Red, and Storage Red. The selections of these three varieties form a continuous series from very early to very late. There are no natural breaks in this series. Therefore they can be separated only by a standardization procedure, which, as an artificial action, is always open to a difference of opinion.

STANDARDIZATION AND NAMING OF VEGETABLE VARIETIES

2. Some selections may have been improved so much that they show an extraordinary difference in cultural value in comparison with the average of the ordinary selections, without being properly identifiable in morphological or physiological characters. One would be inclined to have these exceptionally good selections indicated in a special way.

Mr. NINNIN rejects the addition 'improved' to the name of the variety; he is inclined to prefer a fancy name. But it is possible that he is speaking here of what has been defined above as a 'strain', that is an identifiable improvement not big enough to be called a new variety. In the Netherlands it is proposed to indicate such non-identifiable improvements as 'special breeding products', implying also the right to use a fancy name.

In the third place there are different kinds of hybrid varieties. They may be composed of two, or of several lines. In the course of years components may be replaced by other lines to get still better results. So, in the hands of a competent breeder, they will gradually improve, and show somewhat different characters, without losing their individuality. In general they will not belong to the category of identifiable units. In the Netherlands they belong under the heading of the 'special breeding products'.

THESIS 6

Has been mentioned in the conclusion of the discussions on thesis 4.

THESIS 7

It must be possible to recommend not only varieties, but also non-identifiable units such as selections, non-identifiable improvements of varieties, and hybrid-varieties. Consequently they all must be indicated by names. But these names have a different character.

Only identifiable units are fit for a proper name for themselves that can travel with them all over the world and through the years.

The name of a non-identifiable unit may contain as an element the name of the true variety that is the basic unit and in addition an indication of the person or the company who is responsible for keeping it on a sufficiently high level; or it may be the latter only; but anyway here the essential character of the name is bound to the activity of the breeder; it ends as soon as his activity ends.

I believe there was not much difference of opinion on the essential meaning of thesis 7. But there was quite a discussion on the question if a controlled seed trade would be acceptable as a means to protect the breeders of non-identifiable units. As this was more or less outside the scientific purpose of the conference, it will not be discussed here. I should like to restrict myself to a few remarks on some of the consequences of different systems.

1. One of the features of a controlled seed-trade is to promote the reduction of the number of maintenance breeders per variety. In the extreme every variety would be in one hand or in one combination of hands. In the case of heterozygous plants

the ordinary varieties and their selections might gradually be suppressed, leaving only those breeders who had the best 'special breeding products'. This would shift the accent from the identification of the varieties to the inspection of the actual breeding work of the breeders, which might lead to a different attitude towards the problem of the accurate distinguishing and naming of varieties.

2. Free competition may lead as well to the reduction of the number of breeding companies. To compete one will have to invest more and more money in the breeding work, so that a smaller number of larger companies or combinations will remain. This will promote the same tendency as mentioned above. In heterogamous plants each company will have its own 'special breeding product' and the ordinary selections will diminish in number and importance.
3. In both systems this may lead to the tendency to call both identifiable and non-identifiable units varieties. This would not be so serious if only the scientific and the legal status of the identifiable and the non-identifiable units could be kept apart.

SUMMARY

A report is given of the discussions of the international conference on the standardization and the naming of vegetable varieties, at Wageningen, Netherlands, on August 27, 1955. Seven theses were discussed.

The most important conclusions may be summarized as follows:

1. There was general agreement that a unit for agricultural use should be acknowledged as a variety only if it is identifiable; that means that it can be distinguished from other varieties by clearly contrasting and stable differences.
2. Several participants were of the opinion that a unit that differs in a stable but only small way from an older unit, should be called a strain from the older unit.
3. There are also non-identifiable units for agricultural use:
 - a. Simple 'selections' within a variety of a heterogamous plant.
 - b. Highly improved but non-identifiable kinds of strains of varieties.
 - c. Most hybrid varieties.

The cause of non-identifiability is either that the differences are not contrasting, or not stable, or both.

The simple selections within a variety of a heterogamous plant should have the name of the basic variety. The author's opinion is that non-identifiable highly improved strains of a variety should have the name of the variety followed by a fancy name, or possibly a fancy name only; hybrid varieties always should have a fancy name to themselves.

4. The scientific and the legal status of identifiable and non-identifiable units should be kept apart.

SAMENVATTING

Internationale conferentie over de standaardisatie en de benaming van rassen van groentegewassen, te Wageningen op 27 Augustus 1955.

Zeven stellingen werden besproken.

STANDARDIZATION AND NAMING OF VEGETABLE VARIETIES

De belangrijkste conclusies kunnen als volgt worden samengevat:

1. Er was algemene overeenstemming dat een eenheid voor agrarisch gebruik alleen als ras kan worden erkend als zij van andere rassen kan worden onderscheiden door duidelijk contrasterende en stabiele verschillen.
2. Verscheidene deelnemers waren van mening dat een eenheid die een stabiel maar gering verschil vertoont met een oudere eenheid, een 'strain' van de oudere eenheid moet worden genoemd.
3. Er zijn ook niet-identificeerbare eenheden voor agrarisch gebruik:
 - a. Gewone selecties binnen een ras van een kruisbestuiver.
 - b. Sterk verbeterde maar niet-identificeerbare kweekproducten van een ras.
 - c. De meeste hybride rassen (F_1 -rassen).De oorzaak van niet-identificeerbaarheid is òf dat de verschillen niet contrasterend zijn, òf niet stabiel, òf beide.
De gewone selecties binnen een ras van een kruisbestuiver behoren de naam van het ras te dragen. Naar de mening van de schrijver behoren niet-identificeerbare kweekproducten de naam van het uitgangsras plus een fantasie-naam te dragen, of alleen een fantasie-naam; hybride rassen behoren altijd een fantasie-naam te hebben.
4. De wetenschappelijke en de wettelijke status van identificeerbare en niet-identificeerbare eenheden behoren te worden uiteengehouden.

MEDEDELINGEN ¹⁾

VAN HET INSTITUUT VOOR DE VEREDILING VAN TUINBOUWGEWASSEN

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| <p>31. Sneep, J. De betekenis van de andromonoecische planten voor de veredeling van <i>Asparagus officinalis</i> L. November 1951 f 0,35</p> <p>32. Algemene Veredelingsdagen 1951. Verslag van voordrachten en discussies. Maart 1952 Uitverkocht</p> <p>33. Banga, O. Protection of the breeder's work. April 1952. Uitverkocht</p> <p>34. Sonnville, P. de. De mirabelleteelt. April 1952. f 0,40</p> <p>35. Kronenberg, Hester G. Nieuwe aardbeirassen in West-Europa. Juni 1952 Uitverkocht</p> <p>36. Hofstra, R. en M. Keuls. Onderzoek naar de opbrengst van nicotine van <i>Nicotiana rustica</i> (L.) over de jaren 1949-1950. Juli 1952 Uitverkocht</p> <p>37. Banga, O. en M. Keuls. Praktijkproeven wortelen Amsterdamse Bak 1949-1950. Juli 1952 Uitverkocht</p> <p>38. Banga, O. en M. Keuls. Praktijkproeven zomerwortelen 1949-1950. Juli 1952 Uitverkocht</p> <p>39. Kronenberg, H. G. Veredelingswerk met de aardbei op het I.V.T. October 1952 Uitverkocht</p> <p>40. Floor, J. Proeven met vermeerdering door entstekken, October 1952 Uitverkocht</p> <p>41. Banga, O. Some factors in the growth rate of red garden beets. November 1952 f 0,45</p> <p>42. Sneep, J. Praktijkproeven met Westlandse Boerenkool 1949-1950 en 1950-1951. December 1952 f 1,—</p> <p>43. Een bos enthousiasme. Januari 1953 f 1,35</p> <p>44. Banga, O. Praktijkproeven met Ronde Rode Radijs 1951-1952. Februari 1953 f 0,65</p> <p>45. Gerritsen, C. J. De rassenkeuze bij de Walnoot. Maart 1953 f 1,15</p> <p>46. Kronenberg, H. G. De veredeling van Klein-Fruut in de Ver. Staten van Amerika f 0,65</p> <p>47. Banga, O. en M. Keuls. Praktijkproeven met Berlikumer Wortel 1949. April 1953 f 0,65</p> <p>48. Gerritsen, C. J. Welke kersen moeten we planten. April 1953 f 0,45</p> <p>49. Banga, O., M. Keuls en M. Wattel. Praktijkproeven met Flakkeese Winterwortel 1950-1951. Mei 1953 f 0,90</p> <p>50. Algemene Veredelingsdagen 1952. Verslag van voordrachten en discussies. Juni 1953 f 1,50</p> <p>51. Sneep, J. Praktijkproeven met Spitskool 1949-1950 en 1950-1951. Juli 1953 f 0,65</p> <p>52. Boom, B. K. Internationaal reglement voor de naamgeving van gekweekte planten f 0,75</p> <p>53. Kronenberg, H. G. en F. Garretsen. Opbrengstproeven met aardbeiklonen. November 1953 f 0,35</p> <p>54. Veredelingsdag Groentegewassen 1953. Verslag van voordrachten en discussies. December 1953 f 1,—</p> <p>55. Floor, J. Planten in plastic. Januari 1954 Uitverkocht</p> <p>56. Banga, O. Taproot-problems in the breeding of root vegetables f 0,25</p> <p>57. Jensma, J. R. en A. Kraai. Praktijkproeven met Rode Kool 1950-1951. Juni 1954 f 1,10</p> | <p>58. Jensma, J. R. en A. Kraai. Praktijkproeven met Spruitkool 1950-1951. Juli 1954 f 0,85</p> <p>59. Veredelingsdag Fruitgewassen 1954. Verslag van voordrachten en discussies. Augustus 1954 f 0,95</p> <p>60. Kraai, A. The use of Honey-bees and Bumble-bees in breeding work. September 1954 f 0,45</p> <p>61. Jensma, J. R. en A. Kraai. Praktijkproeven met Witte Kool 1952-1953. Februari 1955 f 1,35</p> <p>62. Banga, O. en J. W. de Bruyn. Selection of Carrots for Carotene Content. Februari 1955 f 0,25</p> <p>63. Kronenberg, H. G. en L. M. Wassenaar. Praktijkproeven met aardbeirassen 1952-1954. April 1955 f 0,90</p> <p>64. Keuls, M. and J. W. Sieben. Two statistical problems in plant selection. April 1955 f 0,35</p> <p>65. Banga, O. The Institute of Horticultural Plant Breeding. April 1955 f 0,25</p> <p>66. Banga, O. Uienveredeling met gebruikmaking van inteelt en herstel door heterosis. Juni 1955 f 0,30</p> <p>67. Banga, O. Carrot yield analysis. September 1955 f 0,30</p> <p>68. Banga, O., J. W. de Bruyn and L. Smeets. Selection of carrots for carotene content. II Sub-normal content at low temperature. September 1955 f 0,25</p> <p>69. Braak, J. P. Effect of temperature and light on June Yellows in strawberries. September 1955 f 0,25</p> <p>70. Banga, O. De ontwikkeling van de rassen situatie bij groentegewassen. Oktober 1955 f 0,25</p> <p>71. Bruyne, A. S. de. Tendensen in de ontwikkeling van het Nederlandse fruitsortiment. Oktober 1955 f 0,40</p> <p>72. Banga, O. Praktijkproeven met Knolselderij 1953-1954. November 1955 f 0,30</p> <p>73. Floor, J., Proeven met stekken onder watervernevelling. April 1956 f 1,—</p> <p>74. Andeweg, J. M. en J. H. Ruyten. Praktijkproeven met Tomaten 1954-1955. April 1956 f 1,—</p> <p>75. Andeweg, J. M. en A. van Steenberg. Praktijkproeven met stoksnijbonen 1953-1954. Mei 1956 f 0,35</p> <p>76. Banga, O. en J. L. van Bennekom. Praktijkproeven met Ronde Witpunt Radijs 1953-1954. Mei 1956 f 0,35</p> <p>77. Smeets, L. and Hester G. Kronenberg. Runner formation on strawberry plants in autumn and winter Smeets, L. Runner formation on strawberry plants in autumn and winter. II. Influence of the light intensity on the photoperiodical behaviour. Juni 1956 f 0,30</p> <p>78. Smeets, L. Influence of the temperature on runner production in five strawberry varieties. Juni 1956 f 0,25</p> <p>79. Smeets, L. and L. M. Wassenaar. Problems of heat spot in <i>Fragaria vesca</i> L. when indexing strawberry selections for viruses. Juni 1956 f 0,50</p> <p>80. Banga, O. and J. W. de Bruyn. Selection of carrots for carotene content. III Planting distances and ripening equilibrium of the roots. Juni 1956 f 0,35</p> <p>81. Banga, O. International conference on the improvement and on the standardization of vegetable varieties at Wageningen, Netherlands, on August 26 and 27, 1955. August 1956 f 0,75</p> |
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PERSBERICHTEN UITSLAGEN PRACTIJKPROEVEN

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| <p>10- 3-'50. Uitslag Praktijkproeven Wortel Berlikumer 1949.</p> <p>29-11-'50. Uitslag Praktijkproeven Bak- en Zomerwortelen 1949-1950.</p> <p>29-11-'50. Uitslag Praktijkproeven Platronde en Ronde Kroten 1949-1950.</p> <p>12-12-'50. Uitslag Praktijkproeven Pronkbonen 1950.</p> <p>21- 3-'51. Uitslag Praktijkproeven Westlandse Boerenkool 1949-1950.</p> <p>3- 9-'51. Uitslag Praktijkproeven Spitskool 1950-1951.</p> <p>7-12-'51. Uitslag Praktijkproeven Flakkeese Winterwortel 1950-1951.</p> <p>23- 1-'52. Uitslag Praktijkproeven Vroege en Herfst Rodekool 1950-1951.</p> <p>31- 3-'52. Uitslag Praktijkproeven Spruitkool 1950-1951.</p> <p>4-11-'52. Uitslag Praktijkproeven Ronde Rode Radijs 1951-1952.</p> <p>4-11-'52. Uitslag Praktijkproeven Vroege Rijspeulen 1951-1952.</p> <p>25-11-'52. Uitslag Praktijkproeven Lange Kroten 1951-1952.</p> <p>23- 1-'53. Uitslag Praktijkproeven Radijs Ron'ê Scharlakenrode Extra Kortloof 1951-1952.</p> <p>13- 5-'53. Uitslag Praktijkproeven Bewaar Rode Kool 1951-1952.</p> <p>10- 9-'53. Uitslag Praktijkproeven Vroege Witte Kool 1952-1953.</p> <p>18-12-'53. Uitslag Praktijkproeven Herfst Witte Kool 1952-1953.</p> <p>3- 6-'54. Uitslag Praktijkproeven Bewaar Witte Kool 1952-1953.</p> <p>17-11-'54. Uitslag Praktijkproeven Stoksnijbonen 1953-1954.</p> <p>2-12-'54. Uitslag Praktijkproeven Ronde Rode Witpunt Radijs 1953-1954.</p> <p>12- 2-'55. Uitslag Praktijkproeven Knolselderij 1953-1954.</p> <p>1- 9-'55. Uitslag Praktijkproeven Vroege Groene Savoye Kool 1954-1955.</p> <p>14-11-'55. Uitslag Praktijkproeven Tomaten 1954-1955.</p> <p>27-12-'55. Uitslag Praktijkproeven Witlof vroege trek 1954-1955.</p> <p>2-3-'56. Uitslag Praktijkproeven Witlof middelvroeg trek 1954-1955.</p> <p>5-3-'56. Uitslag Praktijkproeven Schorseneren 1954-1955.</p> <p>28- 5-'56. Uitslag Praktijkproeven Savoye Kool 1954-1955.</p> <p>28- 5-'56. Uitslag Praktijkproeven Witlof koude kuil en meilof 1954-1955.</p> <p>30- 7-'56. Uitslag Praktijkproeven Tuinbonen 1955-1956.</p> | <p>Zijn geplaatst in diverse tuinbouwbladen.</p> |
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RASSENLIJSTEN ¹⁾
UITGEGEVEN DOOR HET INSTITUUT VOOR DE VEREDLING
VAN TUINBOUWGEWASSEN

Tweede Beschrijvende Rassenlijst voor Populieren, Wilgen en | Achtste Beschrijvende Rassenlijst voor Groentegewas-
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Jaarverslag 1950. 1 (1951) Uitverkocht
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PUBLIKATIES VAN HET INSTITUUT VOOR DE VEREDLING VAN
TUINBOUWGEWASSEN IN ANDERE ORGANEN OF IN BOEKVORM
EVENTUEEL IN SAMENWERKING MET ANDERE INSTELLINGEN ²⁾

De publikaties, waarvan prijs en uitgever worden vermeld zijn verkrijgbaar in de boekhandel. Overigens wende men zich tot de opgegeven bronnen of tot de bibliotheek van het I.V.T.

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¹⁾ Zolang de voorraad strekt kunnen deze publikaties franco worden toegezonden, na ontvangst van het vermelde bedrag op giro no. 425340 van het Instituut voor de Veredeling van Tuinbouwgewassen, S. L. Mansholtlaan 15 te Wageningen onder vermelding van wat verlangd wordt; ook bestaat de mogelijkheid deze publikaties uit de bibliotheek van het I.V.T. te lenen.

²⁾ Eerder verschenen publikaties zijn vermeld achterin in de Mededelingen nos 1 t/m 70.