Chronica Horticulturae, the Bulletin of the International Society for Horticultural Science, aims to bring together such scientific, professional and personal news as may serve to promote international relations and cooperation in horticulture according to the objectives of ISHS and the tradition of the International Horticultural Congress.

Chronica Horticulturae, without trespassing upon or duplicating existing scientific, trade and popular horticultural magazines, aims to cover all aspects and branches of horticulture and is concerned with the interests of horticultural research workers, as well as those of professional growers and amateur horticulturists.

Manuscripts should be in double-spaced typewriting, with ample margins, preferably in duplicate. They should be written concisely and bear the name of the author, his title(s), position and postal address.
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FRONT COVER

*Dipsacus fullonum* - Teasel
Woodcut from: Leonard Fuchs' Kreuterbuch (1543)

# Postharvest Physiology of Cut Flowers

*Michael S. Reid and Anton M. Kofranek**

Since the First International Symposium on the Postharvest Physiology of Cut Flowers at Littlehampton in 1974 there has been a major expansion of international commerce in cut flowers. This increased trade and the rising cost of air freight have stimulated postharvest physiologists to seek new and improved methods for pre-treating, handling and transporting these highly perishable commodities. It is anticipated that the forthcoming Second International Symposium will provide a forum for exchange of their latest research results.

In a recent two-part review, HALEVY and MAYAK (1979, 1980) summarized the bulk of the published information on the postharvest physiology of flowers. Four major factors are involved in determining the storage and vase life of floral crops; temperature, water relations, carbohydrate supply and growth regulators. In this article we briefly discuss the role of each of these factors in the senescence of cut flowers and in the handling systems designed for marketing them.

### Temperature

The rates of development and senescence of cut flowers are strongly influenced by temperature. For example, between the normal storage temperature (0°C) and room temperature (20°C), the respiration of roses and carnations increases approximately 25-fold (Table 1). Relatively short exposures to elevated temperatures can therefore greatly reduce the overall storage or vase life of cut flowers; proper temperature management is obviously the primary goal in upgrading their handling.

Most cut flowers are still cooled (if they are cooled at all) by simply placing them, packed or unpacked, into a coolroom. The need for rapid cooling of large volumes of flowers prior to truck transportation has led to the construction in California of several large 'forced-air' precoolers (RIJ *et al.*, 1979). Flowers cooled in this way and transported in refrigerated trucks arrive at destination markets in at least as good a condition as comparable flowers transported by air freight. Cut flowers originating from tropical or subtropical regions may be deleteriously affected by temperatures below about 12.5°C. As the industry progresses towards proper management of temperature during the postharvest period, the threshold temperatures for chilling in cut flowers will need to be determined so that losses of sensitive commodities can be prevented.

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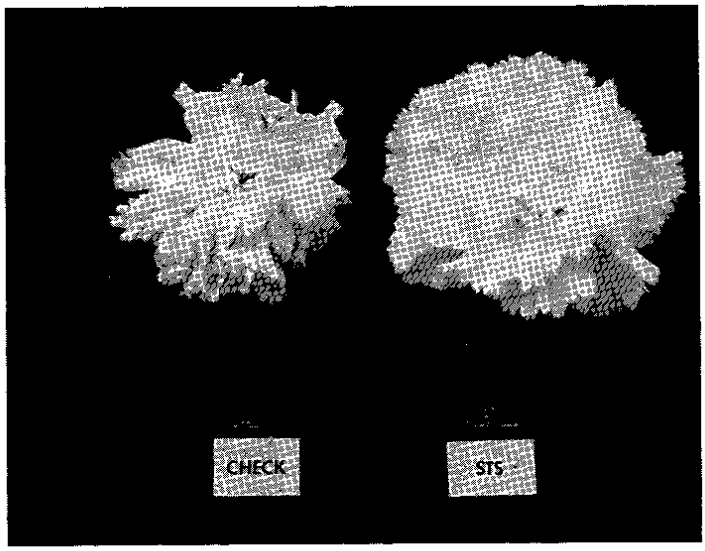
M. S. Reid (left) and A. M. Kofranek

### Water relations

Cut flowers differ markedly from other perishable commodities in their water relations. In most cases they are very susceptible to desiccation, due both to transpiration from leaves. and to their high surface area to volume ratio. Water lost during the postharvest period can normally be replaced from the vase solution when the commodity enters the retail distribution system. Nevertheless, desiccation is one of the most important postharvest problems in the handling of cut flowers, the prime example being 'bent neck,' a disorder of cut roses where the water needs of the foliage and flower are provided at the expense of the relatively unsclerified stem tissue just below the flower. Present information on the movement of water in the stems of cut flowers is sketchy but it is known that it can be strongly affected by the composition of the vase solu-

Table 1. Respiration rates of roses and carnations at different temperatures. (mg $CO^2$/kg/hr)

| Temperature °C | Respiration rate | |
|---|---|---|
| | Carnations | Roses |
| 0 | 0 | 11 |
| 20 | 239 | 293 |
| 30 | 516 | 530 |




Effect of silver thiosulfate (STS) on carnations. After six days in the vase the untreated flowers (left) are wilting; the pre-treated flowers will last for a further 10 days.

tion. Acidic solutions, for example, move much more readily through the stems of cut flowers than solutions which are neutral or alkaline. 'Plugging' of the cut surface of the stem, whether by microbes contaminating the vase solution, particulate or colloidal material in the water, or exudations from the cells surrounding the conducting tissues in the stem, is considered to be a major limitation to the vase life of many cut flowers.

Because of the dramtic effects of water quality (pH, dissolved solids, gases, particulate and colloidal matter) on the vase life of cut flowers, provision of good quality water is an important part of postharvest handling of cut flowers. In many California greenhouses, the water available is ground water, of high pH, and with a moderate to high salt content. Many operators therefore use ion exchange resin deionizers to provide water of adequate quality for postharvest use.

Considerable improvement in hydration of cut flowers can be achieved with any water supply by simply adding sufficient acid to reduce the pH to between 3 and 3.5. In practice, citric acid is a good additive because it produces this pH without danger of the pH falling lower if too much is used. The salts of 8-hydroxyquinoline and aluminum sulphate are commonly used in commercial flower preservatives as 'biocides' but their effectiveness probably also relates to the low pH of their solutions.

With improved temperature management, the handling of cut flowers could change in the future to a dry handling system where the flower is not put into water from the time of harvest until it enters the retail distribution system. This goal will not be achieved without modifications of systems of harvesting, handling and storage so that water loss is reduced to a minimum. Specifically, reduction of the time from harvest until the commodity reaches the proper storage temperature by using forced air precooling will play a major role. It will also be important to prevent desiccation during storage; high humidity storage systems, humidifiers and containers with vapor barriers may all be important, if combined with adequate control of fungal diseases.

**Carbohydrate supply**

Unlike fruits and vegetables, flowers can be cut in the 'bud' stage (before they are 'mature'). In some flowers this is the normal commercial practice (roses, gladiolus); in others, flowers are normally cut near fully open. The dry weight of a fully expanded rose flower is over twice that of the harvested bud and the flower stem cannot supply all the materials necessary to provide this increase in dry weight, so roses opened in deionized water are generally of very poor quality and have a short vase life.

Fortunately it is possible to supply the requisite additional carbohydrate by adding it to the solutions in which flowers are held. In order to inhibit the growth of microorganisms vase solutions normally also contain a biocide such as $AgNO_3$, 8-hydroxyquinoline citrate or Physan-20R (a quaternary ammonium compound). Three types of treatments are used commercially:

a. *Bud opening*. Thight-cut buds are held until the flowers open (usually several days) in a solution containing sucrose.

b. *Pulsing*. Buds or flowers are treated for 16–20 hr in a vase solution containing a relatively high concentration of sucrose.

c. *Vase solutions*. Cut flowers are often held in vase solutions containing a combination of sucrose and a biocide.

Simple formulated preservative solutions effective as bud opening or 'pulsing' solutions for a range of cut flowers are shown in Table 2.

The problem with proprietary 'preservatives' as in vase solutions is that the optimum sucrose content of the vase solution for different flowers varies. Concentrations above 1.5% cause severe foliage burn in cut roses, yet have little effecten on the vase life of carnations. In practice, most formulations use relatively low concentrations of sucrose, avoiding the danger of phytotoxicity, but failing to provide adequate carbohydrate for maximum benefit in many flowers. Some typical formulations of vase solutions are:

Table 2. Preservative solutions for cut flowers.

| Crop | Bud Opening | Pulsing (for 16–20 hrs) |
|---|---|---|
| Roses | None required unless buds cut very tight, then use 1.5% sucrose, 250 ppm 8-hydroxyquinoline citrate, 100 ppm 6-benzyladenine | 3% sucrose, 320 ppm citric acid at 4°C and high R.H. |
| Carnations | 10% sucrose, 200 ppm Physan-20R | 10–20% sucrose, 200 ppm Physan-20R at 20°C |
| Chrysanthemum | 2% sucrose, 75 ppm citric acid, 25 ppm $AgNO_3$ | 5% sucrose, 200 ppm Physan-20R at 20°C and high R.H. |
| Gladiolus | None required, but very tight buds can be opened with the pulsing solution | 20% sucrose, 200 ppm Physan-20R, 20°C |
| Gypsophila | 5% sucrose, 200 ppm Physan-20R | 10% sucrose, 200 ppm Physan-20R, 20°C |

– 1.5% sucrose. 250 ppm 8-hydroxyquinoline citrate
– 1.5% sucrose, 320 ppm citric acid, 25 ppm $AgNO_3$ (not suitable for roses)
– 1.5% sucrose, 320 ppm citric acid (for roses)

**Growth regulators**

Several of the natural plant growth regulators strongly affect the senescence of cut flowers. Contamination of storage and display areas with ethylene gas (as, for example, in supermarkets) can cause rapid senescence of several flower crops, particularly carnations. VEEN and VAN DE GEIJN (1978) demonstrated that the anti-ethylene effects of silver ion could be utilized in the cut flower industry by preparing a stable complex between silver and thiosulfate (STS) which was mobile in the stems of cut carnations. Under California conditions, we have shown that the vase life of cut carnations can be greatly extended by 'pulsing' the flowers postharvest with STS, (Fig. 1) either as a 10 minute treatment using 4 mM STS at room temperature, or as an overnight treatment, using 1 mM STS at 2°C (REID *et al.* 1980). The STS pulse treatment does not replace vase preservatives, but enhances their effect. A combination treatment extends the life of carnations from 6 days to as much as 21 days. This complex promises to be of enormous practical benefit in the handling of carnations in areas such as supermarkets, where ethylene contamination cannot be avoided.

Cytokinins have been shown to extend the vase life of some cut flowers, and are very effective in delaying the senescence of leafy tissue. These properties are utilized by the Israeli flower industry to improve the postharvest quality of statice and of some cultivars of chrysanthemum. Some commercial flower preservatives also contain cytokinins.

**Future research**

While we now have a good understanding of some of the components of flower senescence, and have developed systems to greatly improve vase life of a number of important crops, a host of basic questions remain unanswered, pending further research. How, for example, does the addition of citric acid to vase water improve water uptake by flowers and why is it that many woody flower and foliage materials cannot readily be rehydrated? What factors are involved in regulating the *timing* of flower senescence, and how does silver prevent the action of ethylene in flower senescence? It is anticipated that these and other questions will be feeely discussed in the forthcoming Second International Symposium on the Postharvest Physiology of Cut Flowers.

**Literature Cited**

HALEVY, A. H. and S. MAYAK. 1979. Senescence and Postharvest Physiology of Cut Flowers. p. 204–236. Part 1. *In* J. Janick (Ed) Horticulture Reviews 1. AVI Publishing Company, Westport, Connecticut.

HALEVY, A. H. and S. MAYAK. 1980. Senescence and Postharvest Physiology of Cut Flowers. Part. 2. *In* J. Janick (Ed) Horticulture Reviews 2 (in Press). AVI Publishing Company, Westport, Connecticut.

REID, M. S., J. L. PAUL, M. R. FARHOOMAND, A. M. KOFRANEK and G. L. STABY. 1980. Pulse treatments with the silver thiosulfate complex extend the vase life of carnations. J. Amer. Soc. Hort. Sci. *105:* 25–27.

RIJ, R. E., J. F. THOMPSON and D. S. FARNHAM. 1979. Handling, Precooling, and Temperature Management of Cut Flower Crops for Truck Transportation. USDA-AAT-W-5-June.

VEEN, H. and S. C. VAN DE GEIJN. 1978. Mobility and ionic form of silver as related to longevity of cut carnations. Planta *140:* 93–96.

# Artificial substrates in Horticulture

*A. P. Hidding**

As already reported in Chronica, the working groups 'Peat in Horticulture' and 'Artificial substrates' have been melted together into one group with that long name, written here above. After the very successful meeting in Scotland last year we agreed on another symposium in 1981, and we were very pleased with an invitation of our French colleagues. The preliminary date is 31st August till 5th September 1981 and the place will be Angers, France (200 km South-West of Paris).

There can be found a number of reasons for the tremendous growth in the production and use of artificial substrates during the last decade. For Europe, especially the following aspects are important:

1. The rapidly-growing wealth in the crowded industry-towns of Germany, the Benelux and England raised a big demand for ornamental plants in pot.
2. Large new towns ask for a great amount of ornamental trees, both for private gardens and 'public green'. More and more these ornamental trees are raised in pot or container, so they can be easily transported without root-damaging, can be delivered throughout the year and can be sold in supermarkets or garden-centers.
3. More and more, young plants for commercial growers are raised in 'presspots', not only for glasshouses, but also for outdoor crops, f.i. in the South of France and Germany, in Spain and Italy.
4. In places where there are troubles with soil-pathogenes or with lack of good water, crops can be grown on shallow artificial substrates in which diseases can be easily controlled, and water, air and fertilizers can be given in optimal ratio, especially in glasshouses.
5. Where crops are grown under glass with additional heating, high energy-costs now lead to sharp temperature-schedules, often different for day and night or for succeeding periods. Instantly adjusting of root-temperature is only possible in a shallow (-artificial) rooting zone.
6. The 'oil-money' enabled some Middle-East countries to start vegetable-production. Desalinization of water, trickle-irrigation and artificial substrates are at the basis of very modern vegetable-nurseries. These substrates are imported from Europe.

Although most of the substrates consist totally, or for a high percentage, of peaty material, the tremendous growth in demand and the diminishing peat-recourses in Western-Europe (Dutch substrate-factories alone used already approximately $2.10^6$ m³ of peat in 1979!) leads to an intensive search for other basic materials. There seem to be interesting possibilities in waste-products as for instance bark, fresh or composted. Also good results are obtained with rockwool. Perhaps also town-refuse can be used.

We may conclude that the improvement and development of substrates and the adaption of growing-methods to the opportunities that they provide, must be a very important aim for both horticultural and industrial research. We hope therefore that many representatives out of these research-fields, as well as manufacturers will meet at the symposium in Angers.

Experiments with Anturrium in artificial substrates

*The author is chairman of the working group mentioned in this article. He is head of the Extension Service for Soils in Fertiilzers in Horticulture of the Ministery of Agriculture in the Netherlands.

# Growth regulators in fruit production: An attractive subject

*H. Jonkers**

Since 1970 there has existed an ISHS-working group in this field which has been very fruitful up to now. In 1972 'twin-symposia' were organised at St. Paul (U.S.A.) and Long Ashton (U.K.), see LUCKWILL (1973). This was followed in 1977 by the 3rd symposium at Poznan (Poland). These symposia had many participants and one can ask why so many scientists from all over the world had such tremendous interest in this subject?
The secret lies in the fact that the growth and cropping of fruit trees often is difficult to control and that minute quantities of substances can affect many processes. For example, with daminozide (SADH) and CCC (chlormequat) one can stop the growth of an apple or pear tree for many weeks without any visual damage. From the contents of the first symposium, Acta Horticulturae no. 34, we can notice that growth regulators have been studied in their effects on (1) cuttings and nursery trees, (2) the juvenility, (3) growth, flowering, fruit set, fruit growth and fruitdrop, (4) the harvesting, ripening and quality of fruits, (5) dormancy and frostresistance and (6) even on completely new methods of fruit production.

**Chemical substances**

Herewith we want to control plant growth since all growth is affected by chemical substances. In fact we pursue an economical purpose by producing plants and fruits with as little energy as possible and reduced costs of labour. We are dealing with persistent research workers who are looking for cheap solutions to practical problems. Endogenous hormones which are produced by the plant itself in young leaves, stem tips and roots, are: auxins, gibberellins, cytokinins, abscisic acid and ethylene. They are produced in very small quantities and transported in the plant from the site of production to the site of action. These hormonal substances clearly have an attractive force on nutrient substances and they are steering plant processes. Historically the very first research workers in this field were searching for practical methods to control the process of pollination and fruit set. Very stimulative research was done by Gustafson (see MARTIN, 1979) who reported higher auxin-levels in ovaries of seedless fruits than in seeded fruits. He claimed auxin was the main factor in the set of many seedless fruits such as orange, lemon and grape. Besides the endogenous hormones we know the synthetic growth regulators, consisting of a wide group of chemical substances, which often have analogous effects on plants to the endogenous hormones. The effects of these synthetics are often much stronger than comparable endogenous substances, Some examples are NAA, TIBA, BA, CEPA, SADH, CCC and many others. Most of these growth regulators act by suppressing or stimulating reactions controlled or evoked by endogenous hormones in plants or by blocking or accelerating their biosynthesis. All these effects have been found empirically by spraying, measuring, counting and weighing. We are not well informed about the exact working- principle of these substances. At the symposia of the ISHS we always can meet scientists who are involved in fundamental activities of plant hormones (these are minor groups up to now) and scientists who investigate the practical possibilities (a major group).
However, since we are in the dark about the mode of action of many of these chemicals, stronger support of the first group is necessary. We do not understand the plant as well as we should.
About every new synthetical substance that is introduced, studies are conducted involving concentration, time of application, cultivar susceptibility, conditions of the climate, stage of plant growth and site of action.

**Practical applications**

Practical applications on a large scale can be found in the culture of grapes (Japan, U.S.A.) by modifying fruit- and bunch growth by gibberellins. These substances ($GA_3$ and $GA_{4+7}$) also can stimulate parthenocarpic set of pears especially after damage by spring frosts. The anti-gibberellins daminozide and CCC strongly can inhibit shoot growth and they are applied on young, vegetative, strongly growing trees.
At Long Ashton (U.K.) growth regulators were applied to study very intensive methods of fruit production (the 'meadow orchard') in apple, also inspired workers in Poland, The Netherlands and Israel (for peaches). Until now it did not leave the experimental stage, however.

**Research contacts**

If one realizes that the 2nd world lists of researchworkers in this field, produced in 1978, contains the names of 575 scientists

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Chemical pinching of apple with an experimental growth regulator of I.C.I.-England (JF 2702)

who devote all or part of their time to this field and that the bibliography, produced in 1973, contains more than 1.500 references than it is clear that practical applications are lagging behind in spite of the enthusiasm of so many to work with these chemicals. A deeper understanding of the fundamental processes in fruit plants is necessary. More growth and development physiologists who do not work on growth regulators should be invited to exchange ideas and experiences since they may have different viewpoints of plant responses. The exchange of knowledge and the increasing friendship of scientists in this field are very important and ISHS is a stimulative intermediary.

The next symposium will be held from 21—24 June 1981, at the Cornell University, Ithaca, U.S.A. If you might not have received the 2nd Circular of wish to receive information write to this author.

**References**

LUCKWILL, L. C., 1973. Twin Symposia, an experiment in international communication, Chronica Horticulturae *13*(3): 48–49.

MARTIN, G. C., 1979. Growth regulators in pomology: The end of the beginning. Hort. Science *14*(3): 326–328.

SCHUMACHER, R., 1979. Der Einfluss pflanzeneigener Hormone und Wachstumsregulatoren auf Fruchtansatz und Fruchtqualität, Schw. Zeitschr. Obst- u. Weinbau *115*(27): 826–833.

Symposium on growth regulators in fruit production, 1973. St. Paul, Minnesota, U.S.A., August 1972 and Long Ashton, Bristol, U.K., September 1972. Acta Horticulturae *34*: 507 pp.

Symposium on growth regulators in fruit production, 1978. Poznan, Poland, September 1977. Acta Horticulturae *80:* 476 pp.

# General Aspects of the Federal Republic of Germany *W. Rothenburger*

Some people overestimate the Federal Republic of Germany as to its size, its economic and political importance, some underestimate it. The truth can be found in the middle, as it can often be observed when doing such considerations.

**Size, climate and population**

When regarding the area of the Federal Republic of Germany, you can see that it is small, it takes about the 66th rank among approximately 170 states on the earth (280,000 km²). The length from the North to the South is about 800 km, the width from the West to the East 300 km. Only one quarter of the area comprises farm land, meadows and forests, the remaining regions have a strong density of population with a well developed infra structure. The share of horticultural land comes to about 5% (areas of horticultural products – with 150,000 ha for fruit, vegetable and ornamental plants and 3,500 ha of protected land-as well as hobby and public gardens).

The climate is a temperate one, without very large extremes in temperature and with annual rainfalls by 750 mm. The average temperature per year is by 8°C, the mean temperature in winter —2°C (but even —20°C are possible), the summer has relatively cool days, abt. 18°C in the average (up to 30°C on warm days). In September, the day/night average temperature in Hamburg amounts to 15°C, and 100 mm out of the 700 mm rainfalls which can be observed there per year fall during this month.

The Federal Republic of Germany with appr. 60 million inhabitants takes the 12th rank among all nations. The number of people rose since 1950 when there were less than 50 million ones, but now it stagnates. Nearly 2 million foreigners work in Germany. Although there is a steady move from foreign countries to Germany and vice versa of totally half a million per year, there is a surplus of about 30,000 people who look for a new home country in West Germany. The density of population (250 inhabitants per km²) in the Federal Republic of Germany is relatively strong and is exceeded by only 10 other states. The greater deal of the inhabitants lives in cities, three of them (Berlin, Hamburg and Munich) and the megalopolis of the Rhine-Ruhr-section counting more than 1 million people. The federal structure is based on 11 states. Western democracy is practised by the 3 most important parties and by all state authorities and is supported by the population.

**Economy aspects**

The Federal Republic of Germany gained relatively high importance in economy by its productivity, its export and import (abt. 10% of the world trade), but also by the income of the population and its travels. Thus approximately 15 million West German citizens travel to other states every year, mainly to spend their holidays in the adjoining southern countries having a warmer climate. On the other hand, even abt. 7 million visitors come to the Federal Republic of Germany.

The world has got the impression that West Germany is a very wealthy country with a high living standard. However, there are also abt. 2 million inhabitants who receive social security; it should be mentioned here that the prices for the various needs are unfortunately very high. The economic development has shown an increasing tendency during the last 30 years, but at present a pessimistic opinion predominates with regard to a further growth. The main reason for this assumption is the lack of mineral resources and their increasing prices.

The well developed education system should be emphasized. Nearly all young people are educated theoretically and practically for a profession. About 20% of one age group attend universities, a portion which is presently regarded as being too high. Ten percent of all students are foreigners. For many years there were no men out of work among abt. 20 million employees, today the rate of unemployment is by 5%, i.e. abt. 1 million. The main part of employees is occupied in the secondary sector of economy (industry and handicraft), followed by the tertiary sector (trade, administration, service).

**Horticultural aspects**

Only less than 2 million people work at present in the primary sector, the agriculture, abt. 0.25 million of them in the horticulture. Even in the horticulture more and more people work with trade and service (such as landscape contractors, cemetery-gardeners, florists) than with production. The high increase of imported horticultural products is a main reason for this development. Meanwhile, West Germany counts to the most significant importers of the world with regard to the import of fruit of temperate and tropical areas, citrus, vegetable and ornamental plants. This fact causes tremendous trouble to the local gardeners, as far as it does not concern the large share of products which cannot be cultivated in West Germany.

The population is very interested in horticulture and in plants, the number of hobby gardeners who regularly cultivate, use and buy plants is estimated to be some 20 million. Though themes of horticulture do not belong to the most important ones in the population, people pay relatively considerable attention to them. Even in the Federal Republic of Germany a part of people became fans of the 'green wave', expressing a more serious consciousness as to the environment, to an alternative life, to a garden and a nutrition on natural basis on the one hand, but on the other hand they are not prepared to renounce all conveniences of an energy-wasting civilization as well as of a quality of life which is marked by high technical perfection.

# Facts behind the Congress Tours 1982

*Horticulture in Europe, in the Federal Republic of Germany – particularly in the vicinity of Hamburg shall be demonstrated to you by tours planned preceding, during and following the 21 International Horticultural Congress Hamburg 1982.*

At present 9 different countries with a total population of 260 millions are united in the European Community, 61 millions of them live in the Federal Republic of Germany. Switzerland, Austria, Sweden, Norway, Finland, Jugoslavia and the East European countries do not belong to the EC. Spain, Portugal and Greece are going to join the Community.

The requirements for flowers, fruit, vegetables, ornamental woody perennials, gardens, and recreational areas are rather high. The equivalent of horticultural production in the EC is estimated to approx. 30 milliards of US-$, a portion of more than 20% (= 6 milliards of US-$ = 11 milliards of DM) is fallen to the Federal Republic of Germany. Additional to this home production, the Federal Republic of Germany imports one third of its flower, half of its fruit and two third of its total vegetable consumption, mainly from other EC countries, but also from every other parts of the world.

**High consumption and production**

Compared to other countries of the world, the Federal Republic of Germany together with the Netherlands and Norway has the highest demand for flowers; it is twice the amount of that of the USA, and five times as much as the per-capita consumption in Great Britain. The per-capita consumption of horticultural food is: 80 kg fruit, 30 kg tropical and subtropical fruit, 75 kg vegetables, and 80 kg potatoes a year. There is also high requirement for tree nursery and home garden articles, and for cemetary decoration. Home production covers these demands as follows: 70.000 ha fruit; 50.000 ha vegetables; 17.000 ha tree nurseries; 6.000 ha flowers and ornamentals. But there are also 20.000 ha hops production; 100.000 ha viticulture; and more than 300.000 ha home garden plots.

Since, in the Federal Republic of Germany, horticultural growing areas are mainly distributed at ecologically favourable locations all over the country, the yield quantities achieved are very high. Moreover, commercial holdings producing flowers and vegetables for fresh market are concentrated around cities.

**Vicinity of Hamburg**

In the vicinity of Hamburg fruit, vegetables, and ornamentals are grown in approx. 3.000 commercial holdings. Vegetable and ornamental production is concentrated in the so called 'Vier- and Marschlande'. The biggest concentration of fruit production of the Federal Republic of Germany (approx. 15.000 ha) is at the lower Elbe area, where the main crop are apples; but pears, sweet and morello cherries, plums, damsons, and soft fruit are also grown there. Ornamentals and vegetables are grown on 240 hectares of greenhouses, for example 13% of the home production of cucumbers. Tree nurseries are centered in the north of Hamburg (more than 3.500 ha). This may be the biggest concentration of tree nurseries in the world. Hardy wood trees and ornamental perennials, hedge plants and young plants, fruit trees and soft fruit shrubs, trees for parks and avenue purposes, as well as conifers are produced there.

No wonder that in Hamburg are developed very important markets for ornamental plants (returns of approx. 150 millions of DM = 80 millions of US-$), and for fruit and vegetables (total returns of 800 millions of DM = 430 millions of US-$). These markets supply the demand of approx. 10 millions of people.

A great variety of fruit coming from all over the world are imported via Hamburg.

Northward and southward of Hamburg there are large recreational areas, e.g. the Lüneburger Heide or sea-coasts. Some of the research institutes such as the Federal Research Institute for Horticultural Plant Breeding in Ahrensburg are of more than local importance.

Hamburg and the Federal Republic of Germany are worth being visited. A good occasion will be provided by the 21st International Horticultural Congress Hamburg 1982, and by pre-congress excursions (August 24–28), as well as postcongress tours (September 5–9). These pre- and post-congress excursions will lead to important growing areas of the Federal Republic of Germany, for example to the Bodensee area, to Stuttgart, Frankfurt, Bonn/Köln area, but also to neighbouring countries such as Italy, the Netherlands, Denmark, and others. During the congress brief local excursions in and around Hamburg – up to the Faculty of Horticulture of Hannover University – will be offered every day.

If you require further information about the congress and its tours do not hesitate about writing to the Hamburg Congress Center P.O. Box 302360, D–2000 Hamburg, Germany Fed. Rep. Please also send names and addresses of other colleagues likely interested in the congress.

Prof. Dr. D. FRITZ

# Invited Papers – What do you expect?

*G. Bünemann*

In the past, national and international congresses seemed to consist essentially of presentations of wisdom by dignitaries. Then some scientific societies (but not ISHS) tried to summarize in review papers the current experimental knowledge. The effect was that the main facts could be heard twice: first in the review and then in the 'additional comments' of the individual authors. In ISHS the 'invited paper', presented by carefully selected competent speakers, served the purpose of informing the expert public about recent developments in the field. Unfortunately there was not always time for discussion on these papers in contrast to the lively discussions often following controversial 'contributed papers'. Looking back over horticultural congresses at Brussels (1962), Maryland (1966), Tel Aviv (1970), Warsaw (1974) and Sydney (1978) it is about time to consider what an invited paper should or should not be.

To define a 'contributed paper' is relatively easy: a brief account on results of interest to a public beyond one's own unit (experimental station, laboratory, department, etc.).

*Brief* means about 10–12 minutes for presentation plus 3–5 minutes for discussion,

*results* mean any experimental or survey findings obtained by an author or his team,

*public* means an audience of experts in horticultural science and neighbouring sciences, e.g. botany, biochemistry, macro and micro economics.

A contributed paper is often presented with the aid of slides as sometimes a picture of an experimental plant helps to clarify the issue to those members of the audience not working with the crop or who have had no experience under the respective climatic or economic conditions. The speaker's objective may be to introduce the subject to the audience, to convey a particular message or perhaps to ask for advice on interpretation or for further means of investigation.

The definition of 'invited papers' with regard to objectives, ways and means of achieving them and effects on the audience is probably much more difficult. The concept chosen by many speakers is slanted to a more or less intensive historical perspective. This may be useful, particularly for those in the audience who are attending an international congress for the first time. Another approach, and a very useful one indeed, might be a recapitulation of results of symposia held during the years between congresses. Not only should this more or less retrospective view be considered but also an account of the present state and future outlook. This may provoke an exchange of ideas just as lively as a talk on immediate detailed methods or results.

In a letter to members of Council, Executive Committee, Past Presidents, executives of

neighbouring societies and some individuals known to be active supporters of specific fields within ISHS encouragement was given to recommend young and dynamic scientists who might present a comprehensive lecture on a subject related to their own research and survey work. The reaction was marvellous! Quite a few of the replies (the return amounted to more than 30%) emphasized the age of the persons they suggested, the youngest ones being 28 years old. Some of the nominees might never have attended a congress before and yet they might have important things to say. The thoughts and concepts of young, established scientists could possibly offer refreshing points of view that would stimulate discussion.

Now the programme committee chairman requests all potential participants of the 21st International Horticultural Congress 1982 to let him have in writing their opinion on what they expect of an 'invited paper'. With the invitation the speakers could then receive a broad outline on how to introduce a problem to the audience, how to report on various attempts to solve it and how to discuss future concepts.

Please write to Programme Committee Chairman, Prof. Dr. G. Bünemann, Institute for Fruit Science, Haus Steinberg, D-3203 Sarstedt, Germany, F.R.

## Hamburg Congress in Progress

**Congress in progress**

Preparations for the 21st International Horticultural Congress are reaching a high level of intensity already. In January 1980 the Programme Committee conducted an enquiry among 160 officials of ISHS as well as representatives of various related scientific organizations asking for the nomination of topics to be dealt with during the congress and of potential invited speakers. We would like to thank all the contributors for their willing cooperation. We have had a return of about 30% and received many valuable suggestions.

Some of the subjects which were given special attention are: the energy complex (energy saving techniques, alternative energy sources, low energy requirement plants etc.), genetics and breeding (resistance breeding, gene banks, breeders' rights etc.), and questions related to growth and development (incl. growth regulators and application problems as well as methods and other aspects). Surprisingly little response has been received in the areas of 'quality, ingredients, residues' and 'climate and pollution'.

Out of the great number of recommended topics and speakers the Programme Committee will design a programme which offers possibilities of presentation and exchange to as broad a range of interested colleagues as possible. Of course, we might not be able to include all persons nominated as 'invited speakers', since time and space are limited.

The Programme Committee presented a first outline of the programme at the joint meeting of Council and Executive Committee in Nyborg (DK) in May 1980. Suggestions received there can hopefully, be included in the final outline of the programme which is due in September 1980. Mailing of the 2nd Circular is planned for December 1980. Therefore, if any readers of Chronica Horticulturae want to make comments or voice an opinion on important subjects, please contact the Programme Committee Chairman Prof. Dr. G. Bünemann, Institute for Fruit Science, Haus Steinberg, D-3202-Sarstedt, Germany, F.R.

## Floriculture in Germany (F.R.)

*W. Horn and P. Lange*

Germany (F.R.) is probably the country with the highest per capita consumption of cut flowers, pot and bedding plants. Every German buys flowers for nearly 100,— DM annually, spending 70,— DM for cut flowers and about 30,— DM for pot and bedding plants. Less than half of the cut flowers, however, are produced in the country, most of them are imported from the Netherlands and Italy, but also from Israel, France and other countries. Ninety % of the pot and bedding plants on the other hand are grown in German nurseries.

The total greenhouse area amounts to 2,600 ha which is 1,000 ha more than it was in 1966; floricultural area of land in the open is about 3,700 ha. In the proceeds from selling plant products floriculture is second only to cereal crops in Germany (F.R.). Flower growers turn over more than 2,000 millions of DM annually. Most of the area of land in the open is devoted to annuals, biennials and hardy perennials.

Flower bulbs are grown mainly in the northern and western parts. Furthermore there are 600 ha of flower bulbs and corms including lily of the valley *(Convallaria)*; half of that area serves for propagation, on the other half cut flowers are produced.

Flowers for cutting and ornamental shrubs (for cut branches) are grown on altogether 2,200 ha in the open.

In the protected cultivation of cut flowers (1,300 ha) the most important species are chrysanthemums (426 ha), roses (251 ha), carnations (160 ha), tulips, gerberas and freesias, but with the exception of gerberas the cropped area is decreasing, the area under gerberas and orchids is still increasing.

Bedding plants are grown on 600 ha, one third being *Begonia semperflorens;* 325 millions of pot plants are produced in greenhouses each year, 25 millions of which are foliage plants.

Nursery stocks of ornamentals cover an area of about 10,000 ha under which are 30 millions of roses.

The main centres for greenhouse production of flower crops are found near the densely populated areas: in the North around Hamburg/Bremen, in the western part of Nordrhein-Westfalen, in the more southern states

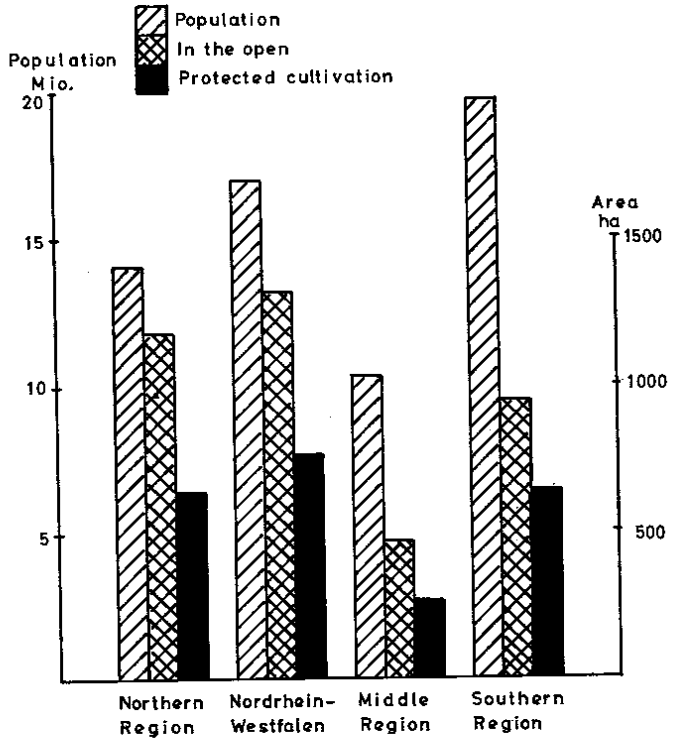
Floricultural area (ha) in Germany (F.R.)

| Federal State | 1 | 2 | 3 | 4 | total |
|---|---|---|---|---|---|
| Schleswig-Holstein | 2.6 | 177 | 81 | 47 | 305 |
| Hamburg | 1.7 | 333 | 43 | 150 | 526 |
| Niedersachsen | 7.2 | 577 | 153 | 115 | 845 |
| Bremen | 0.7 | 36 | 11 | 7 | 54 |
| Berlin (West) | 1.9 | 53 | 13 | 20 | 86 |
| *Total Northern Region* | *14.1* | *1176* | *301* | *339* | *1816* |
| *Nordrhein-Westfalen* | *17.0* | *1320* | *268* | *498* | *2086* |
| Hessen | 5.6 | 281 | 67 | 68 | 416 |
| Rheinland-Pfalz | 3.6 | 166 | 52 | 50 | 268 |
| Saarland | 1.1 | 26 | 15 | 17 | 58 |
| *Total Middle Region* | *10.3* | *473* | *134* | *135* | *742* |
| Baden-Württemberg | 9.1 | 582 | 131 | 244 | 957 |
| Bayern | 10.5 | 368 | 149 | 118 | 635 |
| *Total Southern Region* | *19.6* | *950* | *280* | *362* | *1592* |

1. Inhabitants in millions
2. Area in the open
3. Area for propagation and pot plants, protected cultivation
4. Area for cut flowers, protected cultivation

Source: Fachserie 3, Reihe 3.6 des Statistischen Bundesamtes

the areas around Frankfurt, Stuttgart and Nürnberg, Ludwigshafen/Heidelberg.
There are, however, some other reasons, too. Regarding cut flowers roses have a relatively large area around Hamburg, due to the fact, that former vegetable growers have turned to roses. In Nordrhein-Westfalen, the federal state with the highest population in number and per km² (abt. 17 millions) the largest floricultural area is found generally. In Baden-Württemberg around Stuttgart has been an old centre of carnation-growing, since the American type was introduced to this area at first. Today abt. 36 ha have remained. Gerberas have taken the place of carnations. Most of the area under chrysanthemum is situated in Nordrhein-Westfalen, Baden-Württemberg, Bayern and Hamburg.
Regarding pot plants geraniums are no. 1 (60 millions). They are mainly used as plants for balconies and as bedding plants. There again Nordrhein-Westfalen, Baden-Württemberg and Bayern are main centres due to a warm summer climate. *Erica gracilis* (25 millions) is used for cemetery-decoration in the late autumn. Half of the total amount is grown in Nordrhein-Westfalen, secondary centres are in Niedersachsen and Bayern (around Nürnberg and Würzburg). Third important pot plant is the cyclamen (21 millions), which is, due to climatic conditions grown more often in the northern and western regions, followed by the pot azalea (15 millions), two third of which are cultivated in Nordrhein-Westfalen and Niedersachsen, and potted chrysanthemums (16 millions) which are grown throughout the country. Other important pot plants are begonias (mainly Rieger type, 15 millions) and poinsettias (12 millions).




Floricultural area (ha) and population (mill) in Germany Federal Rep.

## Sarec Workshop on Strengthening Agricultural Research in Developing Countries

The Swedish Agency for Research Cooperation with Developing Countries (SAREC) held a workshop (September 10–17, 1979) on strenthening national agricultural research in which 18 specialists in agriculture from Africa, Asia, South and Central America and, 10 specialists from Sweden took part. Sarec's primary objective is to strengthen research capacities in developing countries. The general aim of the workshop was to establish a basis for Sarec decisions as to the support it gives to agricultural research. The main themes of discussion were the identification of major problems, research priorities, research cooperation, and target groups for research.

**Research orientation**
A lot of discussion was devoted to research orientation and target groups for research. The latter point will introduce the role of more national commitments not only to agricultural research as such but commitments to the problems of poorer people. In the past, there has been little research of this kind. It was generally agreed that there ought to be changes in research focus and that research should take into account the needs for and the possible impacts of changes for all people, e.g., including women. Adequate research policies ought to include discussions on who will benefit from the research and to what extent the results of such research can be easily adopted by the majority of farmers in their local environment. This will call for decentralized research efforts to properly consider the local features. As noted from Tanzania, Ghana, Costa Rica, etc., many research problems are location-specific which will call for more efforts on the national and local level on, for instance, farming systems research.
It is also emphasized that although there is still a need for modern technology in order to increase agricultural production, there is an urgent need for the development of local capability as alternatives to the introduction of Western-type technology. It is concluded that past research efforts have not been able to provide alternatives that are superior to traditional farming and can be accepted by resource-poor farm families who lack access to credit and modern inputs.

**Research cooperation**
Research cooperation is considered an area of great importance. This applies both to the arrangements within an individual country and the different modes of operation with international institutions. It is generally found to be a problem area, although the reasons may be different from country to country. In principle, any collaborative work requires a strong national research capacity. This is needed for research coordination as well as allowing for decentralization of research, accepting the nature of agricultural research. Within any country, there are dif-

ferent ecological regions, each of them with research needs of their own. This will call for a system of agricultural research by the use of a number of eco-climatical agricultural research stations.

In general, this is serious weakness in existing structures and will hamper research cooperation within a country. This problem is noted in the discussions. Although very important, it is an area that has not been given high priority by national governments, nor by donors supporting research activities. In cases where a research network has been developed, the collaborative arrangements are exclusively based upon a single-disciplinary basis, for instance, plant breeding, pathology, etc., sometimes – but not always – combined with a small unit of economics. Technical solutions are worked out for the extension service without the full realization that problems for the resource-poor farm families are not purely technical. It is, therefore, important to apply a holistic view to adequate problem identification of relevant research. There is agreement that such a holistic view is necessary in order to tackle problems of the main target group. In part, the problem identification is a task for the extension service. Too seldom is this service closely related tot the research activities. Furthermore, the extension service is only concentrating its work – as shown by past experience – on 'progressive' farmers and/or larger farmers who have already left the 'traditional and backward practices'. This fact will place far greater responsibilities on the local scientists to make the correct problem identification. This is an area of great concern and there is need for improvements, preferably using different approaches including better involvement also of the farmers themselves.

There are relatively few examples of regional research cooperation and of research collaboration between institutions in neighbouring countries, facing similiar agricultural problems. Existing experience indicates that such arrangements will require certain institutional basic facilities and long-term commitments in the countries concerned and/or at participating institutions. It is stressed that the national research capacity must be strengthened at any event and that this is an area that will receive the highest priority. This type of research cooperation is, however, an area that ought to be further developed.

The research cooperation with international agricultural research centres (IARC) is an area of great concern. The workshop adopted several conclusions.

There are doubts whether the great expenditure in maintaining these centres could be justified in terms of research output and other benefits derived by developing countries. Areas of great concern include some inappropriate IARC research programmes, rigidity of mandates and philosophies and rivalry among IARCs. It was also noted that donor resources, which previously were earmarked for national efforts, were now redirected to the IARCs. It is also noted that utilization of research results from the IARCs requires an ability on national level to absorb and adjust such results to national conditions. Research cooperation between national institutions and international centres therefore should be developed in an appropriate manner with a view to avoid counter-productive approaches and acting against national interest. National scientists ought to be given better opportunities to influence the work of the centres and develop their own skills and expertise.

The centres should continue to serve as sources of germ plasm of important crops and training of scientists. They should also provide specialized services such as complicated analytical work.

## ISNAR for Planning Research

International Service for National Agricultural Research ISNAR is the youngest member belonging to the international centers supported by the Consultative Group on International Agricultural Research (CGIAR). The CGIAR was organized in 1971 to bring together countries, public and private institutions, international and regional organizations, and representatives from developing countries in support of a network of international agricultural research centers and programmes. The basic objective is to increase the quantity and improve the quality of food production in developing countries. ISNAR is the thirteenth and newest member of the CG-family, and was established in the autumn of 1979. Unlike the other international agricultural centers, ISNAR is a service organization. Its primary task is to strengthen the national agricultural research capabilities in developing countries. ISNAR will assist these countries – at their request – to plan, organize and manage research more effectively. This includes assistance in identifying research problems and in formulating research policies, the building up of an adequate institutional infrastructure, and the promotion of specific national or regional research programmes. ISNAR will complement the activities of the other centers of the Consultative Group. It will serve as a linkage between those centers and national agricultural research organizations. It will also assist developing countries to promote cooperation in the field of agricutural research with other countries and institutions and when needed to identify donors. ISNAR will work in close cooperation with all international organizations, in particular FAO, bilateral agencies and foundations. ISNAR is governed by an international Board of Trustees. On March 1, 1980 the Board appointed the first Director-General of ISNAR, who will assume duties on September 1, 1980.

This will mark the start of the work of ISNAR. The Service will be located in The Hague, The Netherlands.

W. VAN VUURE, Wageningen, The Netherlands.

## Technical Centre for Agricultural and Rural Cooperation

In Lome 58 African, Carribean and Pacific (ACP) countries and the 9 countries of the European Community signed the second ACP-convention (Lomé II). One of the results is the establishment of a Technical Centre for Agricultural and Rural Cooperation which will have several functions mainly in the field of science and information.

The Centre shall be at the disposal of the ACP States' authorities responsible for agricultural development in order to provide them with better access to information, research, training and innovations in the agricultural and rural field.

The functions of the Centre shall be a.o.:

(a) to ensure, in particular when requested by the ACP States, the dissemination of scientific and technical information relating to particular questions of agricultural development raised by those States;

(b) to direct to the bodies qualified to deal with them the ACP States' requests in respect of specific techniques or their adaptation in the field of agriculture;

(c) to help make scientific publications on agricutural matters available to the ACP States' agronomic research institutions and provide them with access to data banks;

(d) to facilitate the flow of information on the programming of agronomic research in accordance with priority development requirements;

(e) to bring about meetings between research workers, planners and development personnel so as to improve the exchange of experience gained on matters relating to specific ecological zones and particular topics;

(f) to foster exchange of information and the results of field work between the bodies specializing in the various aspects of tropical agriculture and the rural community;

(g) to help facilitate the adaptation of available information to the needs of extension work and development.

The supervising authority will be a Committe of Ambassadors who will appoint the Director.

## Compendium

There is progress in the work for the compendium for rapidly researchable information about cultivated fruit, vegetable, nut and spice species. In their Newsletter about this project Clive Hackett and Julie Carolane summarize the present situation as follows:

1. The text of the compendium has been drafted and typed. A version is now being prepared for comment by Divisional colleagues.

2. Methods of data-transcription and recording have been decided on which permit progressive accumulation of camera-ready copy. These methods should minimize the

risk of staff-cuts and staff-absences delaying the hand-over of copy to the publishers.
3. Four commercial publishers have recently been approached about publishing the compendium. One has already shown very strong interest.
4. Promised coverage for the compendium now amounts to 190 crops. About 65 data-sets out of the 190 have now been received and 45 of these have been processed by the editors. We now plan to go for a first edition with about 200 crops in it and will accommodate the most recent offers by accepting data until about August 1981. Publication is now likely to occur in about April 1982, and supplements are expected to appear biennially rather than annually as originally envisaged.
5. We need 4 data-sets each working week to suit the revised schedule but are currently receiving on average only about 2¼. Compilers are urged to continue to do their best to meet or beat their promised deadlines. We will not be able to catch up in a rush at the end.
6. Funds are being sought from IBPGR to maintain the position of junior editor for at least 2 years after the present grant runs out in late 1981.

# Reports

## COMMISSION FOR NOMENCLATURE AND REGISTRATION

The commission, represented by the chairman C. D. Brickel and vice-chairman F. Vrugtman reported about the commission's activities at the joined meeting of the Council and the Executive Committee in Denmark on 9–10 May this year.

**1. Commission Membership**
Prof. R. Maatsch (German Fed. Rep) has resigned; Frau E. Löscher has been appointed in his place.
It was agreed that Dr. G. Brits (South Africa) and Prof. Dr. W. Horn (German Fed. Rep.) should be invited to join the Commission.

**2. Revision of International Code for the Nomenclature of Cultivated Plants (1969) ('Cultivated Code')**
A meeting of the I.U.B.S. Commission for the Nomenclature of Cultivated Plants was held in Cambridge, England, during October 1979 to revise the International Code for the Nomenclature of Cultivated Plants.
In addition to the agricultural and forestry representatives on the I.U.B.S. Commission, eight horticultural members may be appointed by the ISHS. The present ISHS representation is Dr. F. Benary, C. D. Brickell, Dr. W. Dress, Dr. P. Lapin, Dr. F. Schneider, and F. Vrugtman leaving two appointments to be made. At the Cambridge meeting Mr. Brickell was appointed Chairman and Dr. Schneider was appointed Secretary of the I.U.B.S. Commission so two further horticultural places are available for appointment by the ISHS, making four in all.
Dr. S. Spongberg (Arnold Arboretum, USA) Prof. R. Lemattre (France) and Frau E. Löscher (Hannover, German Fed. Rep.) have been nominated for three of these positions. The council agreed with this proposal.
The revised version of the International Code for the Nomenclature of Cultivated Plants will be published in 1980.

**3. Publication of Check Lists and Registers**
Since the Sydney Congress notification of the publication of the following International Check Lists and Registers has been received.
a. International Check List of Bromeliad Hybrids (1979) from The Bromeliad Society Inc., P.O. Box 41261, Los Angeles, Calif. 90041, USA.
b. The Gesneriad Register 1978. Check List of *Nematanthus* from The American Gloxinia & Gesneriad Soc. Inc., P.O. Box 174, New Milford, Conn. 06776, USA.
c. A Check List and Register of *Pelargonium* Cultivar Names Part One, A–B, from The Australian Geranium Society, The Science Centre, 6th Floor, 35–43 Clarence Street, Sydney, N.S.W. 2000, Australia.

**4. Confirmation of appointment of International Registration Authorities accepted by the Commission at its meetings in Sydney, 16th August, 1978**
The Council confirmed the following I.R.A. appointments:
Amelanchier: University of Guelph Arboretum, Ontario Agricultural College, Guelph, Ontario, Canada, NIG 2W1. (Dr. R. J. Hilton).
Bromeliads: The Bromeliad Society Inc., 5110 Monte Bonito Drive, Los Angeles, Ca. 90041, USA. (Elmer J. Lorenz and Wilbur C. Wood).
Cotoneaster: Botanic Gardens & Arboretum, University of Agriculture, 662 65 Brno, Czechoslovakia. (Dr. Jindrich Chmelar and Ing. A. Nohel).
Hardy Herbaceous Perennials: (apart from those for which specialist I.R.A.'s have been appointed).
I.S.U. (International Hardy Plant Union), Unterdorf, CH-3424 Niedorosch, Switzerland. (Herr. W. Meier & Dr. J. Sieber).
Hibiscus: Australian Hibiscus Society (President R. B. Bennell), 152 Queen Street, Cleveland, Queensland, Australia.
Proteaceae: (South African Genera Only). Director of Plant and Seed Control, Private Bag X179, Pretoria 0001, South Africa.
Sempervivum: (Incl. Jovibarba & Rosularia). The Sempervivum Society, 11 Wingle Tye Road, Burgess Hill, Sussex, England. (P. J. Mitchell).

**5. Appointment of International Registration Authority**
a. The Plumeria Society of America (President Elizabeth H. Thornton), 2121 San Felipe, No. 109, Houston, Texas 77019, USA, has applied for appointment as I.R.A. for *Plumeria* cultivars. The Commission recommendations to this appointment was ratified.
b. The International Aroid Society, P.O. Box 43–1853, South Miami, Florida 33143, USA has applied for appointment as I.R.A. for cultivated *Araceae*. The compilation of check lists of cultivar names in the genera

About 60 participants were present at the Eucarpia/ISHS Symposium on Asparagus in Giesenheim. They did not come only from Europe, but also from Taiwan, USA and New Zealand. Much attention was paid to tissue culture. The ISHS Section on Vegetables was represented by Dr. van Kampen and Prof. Dr. Hartman.

*Dieffenbachia* and *Aglaonema* are already in progress and the Society is able to publish these lists in 'Aroideana' produced at the Marie Selby Botanical Gardens. The Commission recommendation to this appointment was accepted.

**6. North American Co-Ordinator for cultivars of woody ornamentals**
(other than those for which an I.R.A. has already been appointed).
The American Association of Botanic Gardens & Arboreta has requested responsibility for registration of cultivar names of genera of trees and shrubs within North America. They would be willing to collate and pass on information to other I.R.A.'s already responsible for particular woody genera and would provide a registration service for cultivars of woody genera not already covered by an I.R.A. The Council agreed that these appointments shall be realised.

ORNAMENTALS SECTION

**I.S.H.S. The International Symposium on Flower Bulbs**
The Third International Symposium on Flower Bulbs took place at hotel 'Nyborg Strand' in Denmark from May 5 to May 9, 1980. It was organized by the Research Centre for Horticulture, Institute for Vegetables at Aarslev.
There were 88 participants form 16 countries at the Symposium: Bulgaria 2, Czechoslovakia 1, Denmark 9, Finland 1, France 4, Israel 3, Italy 1, Japan 2, The Netherlands 31, Norway 2, Poland 3, South Africa 2, Sweden 6, United Kingdom 13, U.S.A. 6 and U.S.S.R. 2.
71 papers were presented in two sections:
Section 1: Growth forcing and breeding problems of flower bulbs. 43 papers.
Section 2: Diseases and pests of flower bulbs. 28 papers.
All papers will be published in Acta Horticulturae 109, 1980.
The participants had an instructive and pleasant time during the symposium. The symposium had two excursions and a symposium dinner. The first excurion was to the Research Centre for Horticulture at Aarslev. Here the Institute for Glass-house Crops showed experiments with pot plants, cut flowers and vegetables in glass-houses and the Institute for Vegetables showed field experiments with flower bulbs – storage rooms and all machinery for mechanized growing and handling of flower bulbs.
The other excursion was to the south of Funen, where we visited two bulb growers and 'Egeskov Castle'. Here The Ministry of Agriculture gave a reception in the great hall. The count told about the story of the castle and the countess showed the garden and the large collection of flowering fuchsia.
After the symposium dinner, where many speakers entertained the party, a tourist film about Funen and Odense was shown.
ERLING RASMUSSEN, Aarslev, Denmark.

COMMISSION PLANT DISEASES

**Virus Diseases of Ornamentals**
The Vth International Symposium on Virus Diseases of Ornamental Plants was held at Bad Harzburg, Federal Republic of Germany, May 18–23, 1980. It was organized by the German Phytomedical Society under the auspices of the International Society of Horticultural Science and was attended by sixty one scientists from fifteen countries of all five continents. The main topics of the fourty three research papers given – including nine invited general lectures – were the identification of new viruses in ornamentals, the evaluation of the damage caused by viruses, the improvement of rapid methods for routine diagnosis, the production of healthy planting material and the control of spread of virus diseases. One session was devoted to questions of quarantine, another one to the problem of viroids in ornamental plants. Excursions were organized to the Plant Virus Institute of the Biologische Bundesanstalt at Braunschweig, to the Institute for Floriculture and Plant Pathology of the Technical University at Hannover and to Orchid Wichmann at Celle.
Dr. Michael Hollings (UK) and Dr. Roger Lawson (USA) retired as chairman and secretary, respectively, of the ISHS working group Virus Diseases of Ornamental Plants. The participants of the symposium expressed their deep gratitude to these two men for their engagement. Dr. Roger Lawson was elected new chairman of the working group, Dr. Alan Brunt (UK) and Dr. Renate Koenig (Federal Republic of Germany) will serve as secretary and vice-chairman, respectively. The VIth International Symposium on Virus Diseases of Ornamental Plants will hopefully be held in 1984 at Cornell University, Ithaca, N.Y., USA.
R. KOENIG

FRUIT SECTION.

**Citriculture Working Group**
Several attempts have been made to arrange a meeting on Mediterranean Citrus during the last few years but these have been largely impracticable, due to political and financial constraints. It now appears possible, however, that a meeting in 1983 will be convened by Dr. Luis Navarro fo the Instituto National de Investigaciones Agrarias, Levente, Spain. Dr. Navarro has undertaken to form an Organizing Committee to select a suitable theme related to rootstocks and fruit quality and will report on the progress being made.
Professor H. D. TINDALL, Chairman Commission for Tropical and Subtropical Horticulture.

## First Symposium on Chinese Cabbage

The first international symposium on Chinese cabbage *(Brassica campestris* ssp *pekinensis)* was held at Tsukuba Science City, Japan, from 31 March to 5 April 1980. It was organized by the Asian Vegetable Research and Development Center (AVRDC) and cosponsored by the International Society for Horticultural Science and the Japanese Society for Horticultural Science. Dr. Takashi Kuriyama of the Vegetable and Ornamental Crops Research Station, Japan, and Dr. N. S. Talekar of AVRDC were the coordinators for the meeting. There were 136 participants from 13 countries: Canada, 1, China 14, Great Britain 1, Hong Kong 1, Indonesia 1, Italy 1, Japan 97, Korea 7, The Netherlands 1, Philippines 3, Thailand 1, USA 6 and West Germany 2.
Forty-five technical papers were presented in seven sessions. These covered General topics, Evolution of Chinese cabbage, Plant Protection I, Diseases, Plant Protection II, Insect pests, Physiology of Sexual Reproduction, Physiology of Plant Growth, Plant Breeding. Papers in the General topics session covered the status of Chinese cabbage cultivation and varietal development in Japan. Korea and Bangladesh, management practices for hot, wet season production in Taiwan, and utilization and nutritional aspects. In the Evolution of Chinese cabbage session Prof. Chia Wen Li of Shandong Agricultural College, China, discussed the origin and hybridization of Chinese cabbage. He indicated that wild relatives of Chinese cabbage are not found in China and it is likely that this crop originated from hybridization between a non-heading type Chinese cabbage *(B. campestris* ssp *chinensis)* and turnip *(B. campestris* ssp *rapifera)*.
Papers in the Plant Protection I session dealt with clubroot, soft rot, downy mildew, and virus diseases of Chinese cabbage while papers in Plant Protection II discussed insect pest problems of this crop in Japan, Taiwan and the Philippines.
The session on Physiology of Sexual Reproduction covered various aspects of self incompatibility and cytoplasmic male sterility in crucifers and exploitation of these phenomena in Chinese cabbage breeding and seed production. Papers in the Physiology of Plant Growth session dealt with physiological mechanisms in head formation and heat tolerance, physiological disorders, and preservation of quality during post harvest storage.
The Plant Breeding session covered various aspects of $F_1$ hybrid breeding, interspecific crosses, breeding for disease resistance, techniques for multiple disease resistance breeding and transferring disease resistance genes in closely related *Brassica* species, breeding for adverse environmental conditions such as heat tolerance, and bolting resistance.
Following three days of technical paper presentation the participants toured the facili-

ties at Tsukuba Science City, visited Chinese cabbage grower's field near Iwai-city and travelled to Tsu City to visit Vegetable and Ornamental Crops Research Station. Dr. Sadao Nishi, director of that station, briefed the participants on the research activities of the station and substations attached to this institute. Participants had the opportunity to visit laboratories and modern research facilities. 'Hakuran', an interspecific hybrid between common cabbage and Chinese cabbage developed at this station, was of great interest to all participants. Following this visit participants visited Takii Seed Company's Experimental Station in Shiga Ken. There, the station director and well known *Brassica* breeder, Dr. T. Haruta, briefed the participants on research and training activities and that was followed by a visit to experimental field. The symposium ended with a farewell dinner at Kyoto, the old imperial capital of Japan.

This was the first opportunity for sicentists engaged in research on Chinese cabbage to get together. In the opinion of the participants, the technical material presented during the symposium was very useful. The symposium also served the purpose of developing useful contacts among the scientists from various countries for exchange of information in the future.

Symposium proceedings now are being edited and will be published by AVRDC by the end of 1980.

N. S. TALEKAR, AVRDC, Taiwan, China

## Personal Profile

W.-U. VON HENTIG

Professor Dr. W.-U. von Hentig was born in Berlin in 1928 and received his early experience in horticulture in a large pot plant and cut flower nursery, as well as in his family's own nursery, both near Potsdam. He studied horticultural sciences at Hannover Technical University from 1950 to 1953, and then worked on his doctor thesis at the Institute of Ornamental Plant Research under the guidance of Professor R. Maatsch, gaining a doctor's degree in 1956. Following eight months of research activities in Switzerland, v. Hentig returned to Berlin (West) where he joined the Institute of Ornamental Plant Research of Technical University as assistant professor. Between 1960 and 1967 he was temporary head of that institute, including teaching activities both at Technical University, and the Academy of Horticulture. In addition, he was department head at the Academy of Horticulture for two years. In 1967, he was appointed head of the newly established Institute of Ornamental Plant Research of the Research Station of Viticulture and Horticulture at Geisenheim/Rhein; this position includes teaching courses to undergraduate students.

His early research interests centered on problems of propagation of ornamental plants, e.g. of mother plant treatments and their effects on curring production, storage, and rooting. He gave also attention to investigations into the proper stage of development of the mother plant parts to be used for propagation. At the same time he was active in establishing and improving contacts with a great many of national and foreign young plant nurseries and institutes engaged with research programs similar to his own ones. Results of his research work have been summarized in great a number of publications.

Besides research activities, studies on foreign horticulture makes an important part of v. Hentig's work. Due to this fact, he was provided opportunity of establishing contacts, and gaining knowledge and experience that promote his contributions to ISHS activities. v. Hentig is one of the co-authors of the four-part book 'Gartenbau International'.

Professor v. Hentig has devoted personal activity to Society affairs. He is a member of the Commission for Protected Cultivation and, since 1978, the chairman of the Section for Ornamental Plants (a member since 1974, the secretary from 1974 to 1978). He also is a member of the German Society for Horticultural Science and now is active both in the program, and in the excursion committee for the 21st International Horticultural Congress Hamburg 1982. His multilateral contacts, his organizing capacity and his energy will benefit the congress as well as the ISHS.

D. FRITZ, President of the ISHS Chair of Vegetable Crop Research, Techn. University München D-8050 Freising-Weihenstephan, Germany, Fed. Rep.

## News from the ISHS Secretariat

**New Council Member**

For Australia Mr. J. P. Fallon will replace Mr. W. F. Walker, the immediate Past President, who has indicated that he did not wish to be re-appointed as an Australian representative on the Council. Mr. J. P. Fallon is Chief of the Division of Horticulture, Department of Agriculture, Perth, W. A.

**New members**

*Affiliated organizations*

*Australia:* Hobart Technical College
*Japan:* Seiwa Kagaku Corporation
*United Kingdom:* The Nickerson Seed Comp. Ltd.
*U.S.A.:* H. P. Metzler & Sons Ltd.

*Individual members*

*Australia:* F. J. Ingratta, Andrew John Burton, Dr. J. Wiebe, E. A. Rees Linton
*Denmark:* Ing. Anne-Grethe Elvang, Ing. Ole Skov, Jens Solvang, Ing. Jan S. Ström, Ing. Steen Traberg-Borup, Prof. Jörgen Vittrup
*Egypt:* Dr. Ahmed Sayed I El-Ballal
*Greece:* Alice Kalou-Gianoulopoulou, Ing. Agron.
*Israel:* H. D. Rabinowitch, E. E. Goldtschmidt
*Italy:* Dr. Martinelli Alessio. Ir. D. H. van Sloten
*Japan:* Atsushi Hasegawa, Y. Hori, Teruo Nishida, Yukio Nishikawa, Masataka Ohya, M. Yokoi
*Mexico:* Dr. Homero Ramirez
*United Kingdom:* Derek Ray, Andrew Paterson, Dr. M. R. Turner, J. F. Townend, Mrs. Lila W. Dick
*U.S.A.:* Peter Thompson, E. Gary Aldrige, M. M. Ramadan, S. A. Kheshem, L. J. Nelson., J. L. Griffis Jr., N. R. Bhat, J. D. Norton, C. F. Krarup, D. F. Filler, K. E. Nelson.

**Change of address:**

Prof. dr. S. A. Paunović, chairman of the working group on Apricots culture and delcine has got a new address: Agronomski Fakultet, Care Dušuna 34, 32000 Čaćak, Yougoslavia.

PERSONAL PROFILES OF SECRETARIAT MEMBERS

In addition to the photograph of staff members in the last issue of this bulletin (vol. 20–1) in short personal profiles are given of each of the staff members of ISHS secretariat.

J. P. L. L. A. Burg, Assistant Secretary-General retired in 1973, as an official of the Ministry of Agriculture, Section Horticulture.

In December 1973 he joined the I.S.H.S. Secretariat Staff on request of Dr. de Bakker. In 1974 he took over the responsability for the dayly conduct of the I.S.H.S. secretariat since Mr. Orbaan was growing too old and

had to stop his services to the I.S.H.S.

Mrs. Schmidt-Snapper is working for the Secretariat from the start. In the beginning she took care of all kinds of work, together with the late Mr. Orbaan.
After her marriage in 1968 she has a part-time job at the Secretariat – during the morning hours – and since then her task has become more specialized. She now handles part of the financial administration, the sale of Acta Horticulturae and the administration of the subscriptions to Acta, and assists Mr. Van der Borg with the contacts with the conveners of symposia and with the editing of Acta Horticuturae.

Mr. H. C. P. Jacobs studied 'Marketing' at the Higher Economic School 'J. van Zwijndregt' in the Hague. This is one of twelve schools in this country for advanced economic and administrative education (H.E.A.O.). All of these schools provide 3-year post-secondary school courses and prepare students for managements jobs in trade, industry and organisations on a level comparable to that of a Bachelor's degree.
His special interest is in 'Marketing activities of non-profit organisations' which was also his special compulsory subject which he had to defend at his final examination. He completed his studies in June 1979 and joined the I.S.H.S. in July 1979 to be trained in all administrative aspects of this organisation.

Mrs. Bargon-Boelens is working for the I.S.H.S. Secretariat since February '76. She has a part-time job (3 days a week) and is taking care of all the typing (letters, Reports, Agenda's etc.) She also administrates the incoming and outgoing post, keeps the records and the memberadministration.

ACTA HORTICULTURAE

**Acta 95 - Small fruit virus diseases**
The syposium on small fruit virus diseases was held last year in Budapest, Hungary. The volume of Acta Horticulturae, containing 11 papers in 91 pages was prepared by the Hungarian Institute for Plant Protection and Agrochemistry. The papers deal with strawberry (2), raspberry (4), blueberry (1), gooseberry (1), rubus (1), ribus (1), stock production (1). Further an article on small fruit production in Hungary is given.

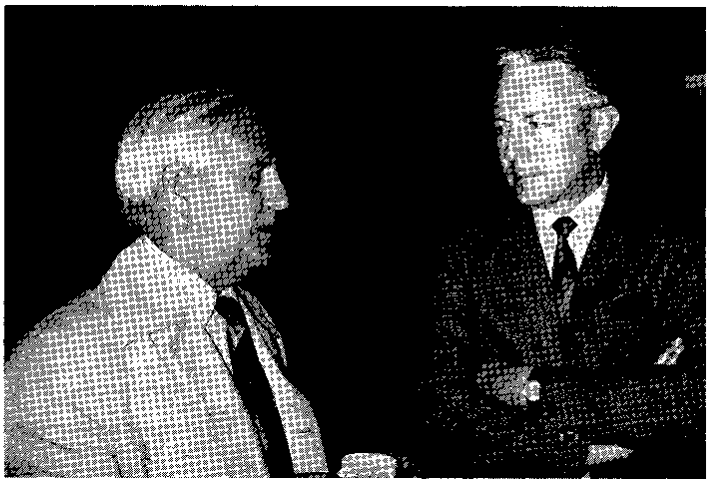
**Acta 99 - Substrates in horticulture, other than soils in situ**
This volume of 228 pages contains 30 lectures on various aspects of substrates in horticulture, other then soils *in situ*. The symposium held in Auchincruive, Scotland was attended by 60 persons who had the newest information on peat as substrate (6 lectures). pine bark (1), beech bark (1), wood waste (10), bark sludge (1), town refuse compost (1) artificial mix substrates (1), inert substrate (1), aeroponics (1), Scoria (1), mineral wool (1). Further lectures where given on fertillers (3), salinity (1) and analytical subjects (6).

**In preparation**
85. Sixth Symposium on Apricot culture and decline, Yerevan, July 1977.
88. Symposium on Labour and Labour Management, Wye College, September 1978.
90. Symposium on Cashew cultivation and processing, Cochin, Kerala State, March 1979.
92. Symposium on Mineral nutrition and fruit quality of temperate fruit zone trees, Canterbury, April 1979.
94. Symposium on Fruit tree virus diseases, Budapest, July 1979.
96. Symposium on Spices and medicinal plants, Budapest, July 1979.
100. Symposium on Production of tomatoes for processing, Evora, September 1979.
107. Symposium on Growth optimalization through microclimatic control under protected cultivation, Avignon, October 1979.

*XXth Int. Horticultural Congress – Symposia*
105. Symposium on Horticulture for the people, Sydney, August 1978.

## Council and Executive Committee Meeting

On May 9–10 this year, the Council and the Executive Committee had a well-attended meeting in Nyborg, Denmark. Under the chairmanschip of Prof. Dr. Fritz first the present position of the organisation was discussed. In its 21 years of existence the society with its 13 commissions and sections and over 50 working groups, has become integrated in nearly all scientific areas which deal with horticulture. The main activity is to promote contacts between horticultural scientists, mainly through symposia, meetings, congresses and publications. This has been a success if one considers that since 1970, 109 symposia have been arranged, meetings for which the interest is growing. At the same time one has to realize that horticulture houses a great variety of specialists who wish to meet their colleagues outside horticulture in fields such as irrigation, plant protection a.s.o. A question to be answered in coming years is whether the society should establish more specialized sections and working groups on e.g. tissue culture, air pollution, post harvest problems etc. Another way could be to strengthen the cooperation with other specialized organizations which already are organizing meetings and congresses in such fields. It is estimated that already more than 115 congresses and other meetings in related fields have been organized during the last ten years. Until now joined symposia of ISHS commissions and sections have been successful and it was recommended that organizers of symposia should consult other organizations for cooperation where ever this is possible.
The secretary/treasurer general announced that after the Hamburg congress his 21 years of service to the society will come to an end. The Executive Committee is investigating possibilities for a successor in several countries. A difficulty is that the present office of the secretary has a well-trained staff which has been very much assisted by the Ministry of Agriculture in the Netherlands. It was stated that preferably the secretariat should be seated in the same country as the new secretary general but that other solutions should be considered. For the following meeting proposals will be prepared to decide upon.
Full attention was given to the financial



Prof. Dr. Fritz (right) and Prof. Dr. Klougart during coffee break

The delegations of Australia, Belgium, Denmark and German Democratic Republic

position of the society. The present rate of inflation has caused a certain pressure on the budget, and another difficulty is that the Dutch Ministry of Agriculture stresses the need to reduce its assisteance. Several proposals were made for increasing the subscription fees, especially for country members. At this moment there are four classes in which countries can contribute (Dfl. 300, Dfl. 900, Dfl. 1800, and Dfl. 3000). Each country is free to decide how much it will pay, and it was the general opinion that too many countries prefer to be in one of the lowest classes. Suggestions were made to reduce the number of classes and to design a new scheme for payment, with higher contribution rates. During the Hamburg congress decisions have to be made about the increased subscription fees of country members, affiliated members and individual members. It is hoped that the present drive for more members, could avoid a drastic increase.

Much time was taken to discuss the activities of sections, commissions and working groups. Most of these groups have been very active since the last meeting. Proposals were made for new symposia, chairman and secretaries. It was also decided to dissolute the Commission on Communication and Information, because of a lack of support and ideas. Further it was considered to establish a group on post-harvest horticulture. Since the principles of this subject apply to the whole range of fresh fruit, vegetable and ornamental crops it was proposed to form a single commission rather than to discuss this theme in various working groups within the three crop sections. Recommendations will be made for the next meeting.

Further reports were given related to the Hamburg Congress 1982 for which a complete schedule was presented, The USA delegation informed about the congress in Davis-California, which will be held on August 11–20, 1986.

After the meeting excursions were made to the Institute for Glasshouse Crops at Aarslev, the Institute for Fruit Research at Odense and several nurseries in this region.

The local organization was in excellent hands of Prof. Klougart whose hospitality and organizing abilities was very much appreciated by all participants to the meeting.

The next meeting will be on 25 and 26 September 1981 at Antibes, France. G.S.

## Letters

□ Dr. Sylvia Guelfat-Reich of the Volcani Centere, Bet-Dagan, Israel has written a letter to Prof. Dr. Bünemann of the Hamburg Congress Organizing Committee on his contribution about the presentation of scientific results by posters. In this letter she stated:

'Posters, in my opinion, can be a very useful and suitable way to present results of experiments during a Congress. But, as you mention, their suitable representation is of major importance – graphs, pictures and minium of text. It is difficult to read a long text looking at a poster. I also see importance in including in the programme of the Congress special time for posters – and not, as it sometimes happens, parallel sessions of papers and posters. I think that in the future most of the experimental results will be represented by posters and only reviews of the main subjects will be given as papers. Thus as for a Congress.

But it seems to me that a poster cannot come instead of a written paper in a scientific journal. Looking at a poster is not the same as reading a paper in a journal. In that case the reader is interested not only in results, but also, and sometimes especially in materials and methods, and in the discussion which can enhance new ideas.

Therefore, it seems to me that in the future a scientific work should be presented in a journal as a written paper.'

□ From a letter of Dr. C. J. Bishop, Council Member for Canada some lines related to Chronica.

Through the medium of Chronica Horticulturae the global developments in horticulture can be very effectively disseminated around the world, and I would like to commend the editor for its continuing excellence and his good work. I believe the articles in it should be kept short, with lots of pictures and news items on Society happenings. Increasing the number of individual memberships will spread the effectiveness of its coverage. I would favor increasing the Chronica's frequency and reducing the size of each individual issue.

The subject of genetic resources in horticulture is one that merits greater attention by the Society, and Chronica Horticulturae might consider the promotion of seed and scion exchange (within quarantine regulations) through the inclusion of such a section in each issue.

(See Correspondents' Notes: Taiwan in this number. G.S.).

□ Dear Sir,

In the April 1980 issue of Chronica Horticulturae the editorial article 'Needs for research on little-known legumes' was published. I wish to comment on the introductory remark 'There is a chronic protein deficiency in virtually every developing country.'

Up to some years ago the leading theory was that a protein shortage in most of the developing countries was prevalent. However, the most recent opinion is that most of the undernutrition is simply due to an inadequate intake of energy, usually as a result of poverty. Where energy intake is sufficient, most protein requirements are also met adequately, with the exception for regions where the population is mainly dependent on root crops and plantain. In most countries rich and poor alike, protein provides approximately 10% of the dietary energy, which appears to be the balance spontaneously reached by human beings. However, it is the proportion of animal protein which rises with income.

Unfortunately, the following remark that the 'Green Revolution' often has led to decreased legume production is quite true. However, it would have been explanatory if there would have been added that the yield of legumes in weight and energy per ha is so much less than those of cereals.

Most of the research on high-yielding varieties has been focussed on cereals. As nutritionists, we like to emphasize an increased attention on high-yielding legume varieties as these would provide economic incentives for the small farmers to grow grain legumes. Especially in regions where root crops such

as cassava are the staple food, legumes are of great importance as complementary food. Due to the mutual complementation of their essential amino acids, the same holds for mixed diets of legumes and cereals, which both have a low nutritional protein value if consumed separately.
Therefore, we fully wish to support the opinion that increased attention from researchers and farmers towards legumes is needed.

Reference:
Zwartz, J. A. and J. G. A. J. Hautvast 'Food supplies, nutrition and plantbreeding' in Plantbreeding perspectives, 1979 Pudoc, Wageningen
(a limited number of copies is available)
Judith A. Zwartz, Department of Human Nutrition, Agricultural University, Wageningen The Netherlands.

# Correspondents' Notes

**New Correspondent**
We kindly welcome the new correspondent for Turkey: Prof. Dr. Fahrettin Macit, College of Agriculture, Department of Vegetable Crops, Bernova, Izmir, Turkey.

## BELGIUM

□ The Genebank of the Faculty of Agronomy at the Univeristy of Gembloux maintains a major collection of the tribe Phaseoleae: *Phaseolus* 18 sp., *Vigna* 43 sp., *Macroptilium* 8 sp., *Macrotyloma* 5 sp., and *Centrosema* 4 sp. A number of *Phaseolus* hybrids are also held. The research team at Gembloux has collaborative arrangements with the IBPGR, IITA Nigeria, and CIAT, Colombia. Two-thirds of the accessions have already been deposited for long-term conservation in cold storage.
□ A critical list of groups of 86 apple and 244 pear samples of named Belgian cultivars cellected at the Plant Pathology Station Avenue Maréchal Juin 11, 5800 Gembloux, Belgium has been published recently and is available at the Station. Also available in stencilled form is a list of all apple and pear cultivars of all origins present in the Belgian collections at the time of their survey.

## COLOMBIA

**Cassava germplasma**
The Centro Internacional de Agriculture Tropical at Cali, Colombia is developping a tissue culture method for propagating and storage of cassava germplasma collection. The collection comprises currently 2500 entries and some 1000 more are expected. Untill now the collection is maintained in clonal form by continuous field cultivation. This method is expensive and causes losses through pests and diseases. Moreover exchanges with other countries meets quarantaine barriers. It is hopes that the new method will aid to overcome these difficulties.

## DENMARK

**Danish Agricultural Fair**
At the end of June the annual Danish Agricultural Fair – Ungskuet – was held in Herning were no less than 150 new machines were introduced. In fact the manufacturers had entered more than 300 new products, but only about half of them were approved by the expert committee judging the products. It is surprising to see this tremendous development in farm machinery at a time when the Danish manufacturers and Danish agriculture are facing difficult conditions. More than fifty per cent of the Danish agricultural machinery production is exported at this moment.

## GERMANY FED. REP.

**German Society for Horticultural Science**
The German Society for Horticultural Science held its annual meeting on March 20–21 in Hannover. The opening address by the present president of the society, Prof. Wehrmann, was followed by general lectures given from Prof. Jungk on problems of nutrient uptake and Prof. Wricke on breeding research. 78 lectures were presented in concurrent sessions in Economics, Fruits, Vegetables, Floriculture and Horticultural Engineering.
A short account shall be given of the papers and posters presented in the Fruit Section. Particular interest was focused on the fields of plant protection, mineral nutrition and rootstock problems. Influences of fungicides as well as nitrogen nutrition on the quality of apples were discussed. A method for determination of the available nitrogen which has successfully been applied in agricultural crops was evaluated for its use in orchards. The present state of development of micropropagation of strawberries was documented. Pollination of plums is very much subject to climatic conditions. The reasons for specific apple replant disease are not clarified yet, gas concentrations in the soil might be of importance. Side-effects of a frost-protection irrigation were discussed. While most contributions dealt with temperate zone fruits, one paper informed about problems with the cultivation of Citrus unshu in Turkey.
Angelika Joseph, Institute for Fruit Science, Haus Steinberg D-3203 Sarstedt, Germany, F.R.

## IRAN

**Biological Conference**
First Arab Conference of biological sciences was held in Bagdad from 21–24 April, 1980, under the auspices of the Arab Biologists Union. Scientists from various Arab Countries participated in this four-days-long confence. As many as 125 scientific papers in different disciplines of biological sciences were presented. Research papers dealing with agricultural science including horticulture and at date palm formed an important feature of the conference. Most of the agricultural/horticultural research papers centred on fertilizer application, physiology, general botany, entomology and pathological studies in different crops. Abstracts of all the research papers presented in the conference have been published in english and arabic languages.
Hassan R. Shabana, Baghdad, Iran

## ISRAEL

**Botanical Congress of Israel**
On the passover week it was again time for the annual Botanical Congress of Israel. It was held during two days on the campus of the Volcani Agricultural Research Organisation at Bet Dagan, (April 3–4, 1980). During the first day, 24 contributed papers were given in 5 sessions (2 of which simultaneous) in the fields of developmental physiology, fruit structure and physiology, biochemistry and cell metabolism, environmental and applied botany. All papers were in Hebrew as usual except for an interesting invited paper on uses and misuses of herbicides by Prof A. Galston of Yale (actually on Sabbatical at the Department of Horticulture of the Hebrew University of Jerusalem) which aroused great interest.
The contributed papers of general interest included amongst others synthesizing enzymes of polyamines in meristematic tissues (Cohen *et al.*), polyamine effects on growth and development (Altman and Bachrach), studies of isolated vacuoles (Admon *at al.*), quantitative HPLC and GLC of extracted IAA (Epstein). Other papers mentioned in the following had a particular horticultural interest as a series of studies on citrus fruit tissues. Metabolic activity of lemon fruit explants growing in vitro was discussed (Gülsen- a charming lady from Ankara Univ.-*et al.*); essential oil glands structure was studied and oil transfer from cytoplasm cells to the glands, through cell walls documented by SEM micrographs (Shomer); cytology of peel tissues damaged by rough handling (Shomer and Erner) and changes in cell wall components of orange peel albedo, during ripening and senescence as well as extraction methods (Ben-Gad *et al.*) were also discussed. Tomato studies included induction of ripening in NOR mutants by NaCl as well as gel electrophoresis of endogalacturonases from ripening tomatoes (Mizrahi *et al.*). Additional topics included influences of damage on avocado ripening (Zauberman and Fuchs), studies on germination and grafting of Macadamia (Kadman and Jaffe), self pruning of grapevines (Shulman), the description of a solarly heated and cooled hydroponic greenhouse (Ben Yaakov *et al.*) etc.
Next day a symposium on ethylene (chaired by Goren) was held in English with the participation of H. Kende (from Michigan State Univ.) as a guest speaker. His very interesting paper dealt with new findings on the critical precursors (SAM and ACC) and enzymes involved in ethylene biosynthesis. Another guest, now working in Israel, Autar Mattoo, spoke on recent work about common regulatory features of higher plants and microorganisms in ethylene biosynthesis,

namely membrane involvement and reversible inhibition by phosphate. The same workers (Chalutz *et al.*) also reported evidence obtained by a non-ethylene-producing (NEP) *Penicillium* isolate that ethylene has no direct role in the pathogenicity of the fungus. Other shorter contributions in this very interesting symposium dealt with ethylene promotion of IAA metabolism (Riov *et al.*), with interactions of ethylene and uronic acid oxidase in citrus abscission zones (Huberman and Goren), with environmental conditions affecting penetration or decomposition of ethylene releasing agents (Ben-Tal) and with possible modes of action of metabolic (ACC) and non metabolic (ethephon) ethylene 'precursors' in olive leaf, flower and fruit abscission (Lavee). A very interesting discussion ensued where amongst other topics this fact that SAM is a precursor for both the senescence hormone (ethylene) and rejuvenating factors (polyamines) was focused. –

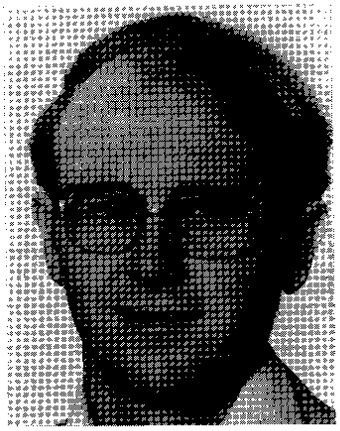
Prof. S. P. MONSELISE, Rehovot.

## JAPAN

### Meetings

□ 'The Fourth International Citrus Congress' was arranged to be held from Nov. 9 to 13, 1981, at the Keidanren-Kaikan Hall in Tokyo. Schedules are as follows – Nov. 9; registration and opening session, Nov. 10 to 12; presentation of papers in sections, Nov. 13; symposium on the world citrus industry, Nov. 14; field trip to Shizuoka. Main staffs of the executive committee are composed of Dr. S. Tanaka (President), Mr. T. Chino (Vice-President), Prof. T. Oohata (Program Chairman), Prof. K. Matsumoto (Editorial Chairman) and Mr. M. Nishiura (Secretary General). All applications and correspondences in relation to this congress should be addressed to the Secretary General whose address is Okitsu Branch, Fruit Tree Research Station, Okitsu, Shimizu, Shizuoka 424–02, Japan.

□ 'The Fifth International Congress of Plant Tissure & Cell Culture' is expected to be held from July 11 to 16, 1982, at Hakone, a famous summer resort. Inquiries about the congress should be addressed to IAPTC Congress, Japan Convention Services, Nippon Press Center Bldg. 2–1, 2-chome Uchisaiwai-cho, Chiyodaku, Tokyo 100, Japan.



Dr. Allan Rae, New Zealand

### People

□ Prof. Y. Mihara (meteorologist), Vice-Chairman of East-Asian Section, Commission of Horticultural Engineering of ISHS, retired in April, 1980, from Dept. of Horticul., Chiba Univ. In the same Chiba University other scientists retired: Prof. K. Kosugi (floriculturist), Prof. R. Iwasa (plant breeder) and Prof. T. Noda (pomologist) whose post was succeeded by Dr. N. Hirata.

□ The Ministry of Agricul. Forest. & Fish., reported on retirements of Dr. M. Kageyama, Head of Dept. of Protected Cultivation, Vegetable & Ornamental Crops Research Station, and Mr. T. Sato, Head of Akitsu Branch, Fruit Tree Research Station, and Dr. Y. Ozawa, Dr. Y. Nakagawa succeeded to their posts, respectively.

□ Dr. Eikichi Sawada, emeritus prof. of Hokkaido Univ., died of myocardial infarction at the age of 77, Feb. 25, 1980, in Sapporo, Hokkaido. He was professor of horticulture, Hokkaido Univ. and council member of JSHS for long time. Main projects of his research works were cracking mechanism of sweet cherry fruits, chemical control of maturity of apple and *prunus* fruits, CA effects on apple fruits, and propagation and cultivation of Chinese yam and asparagus plants. His doctoral thesis was 'Über die wahre Natur der Erd- und Luftknollen von *Dioscorea Batatus Decne*' presented in Jour. of Fac. Agr. Hokkaido Univ. Vol. 47(1952). He wrote also a book 'Asparagus' (in Japanese).

### Miscellaneous

□ 'Seedless' and normal sized-fruits of Delaware grapes could be produced by dipping flower cluster to GA solution (100 ppm) twice – 2 weeks before flowering and 10 days after flowering – and their harvest time was hastened 3–4 weeks compared with that of non-treatment which is late August. Those treatments were introduced to Japanese vineyards about 20 years ago, and the most successful results were obtained with Delaware variety. Since then, this variety became 'seedles' in Japan. In addition to GA treatments, forcing by covering with plastic film house and by heating, from middle January at the earliest, made the harvest of Delaware possible in late May.

However, since dipping flower cluster to GA solution is laborious, and heating cost became expensive recently, improving GA application method and energy savings are awaiting solution.

M. IWATA, Tokyo

□ Processed use of fruits and vegetables in Japan (Statistics from Minist. Agr. Forest. & Fish.)

| Fruits (1976)* | Quantity for processing (ton) | Percentage in total production (%) |
|---|---|---|
| Satsuma mandarin | 769,600 | 28.0 |
| Apple | 112.200 | 13.6 |
| Grape | 26.344 | 9.4 |
| Peach | 96,471 | 38.3 |
| Sweet cherry | 7,390 | 46.0 |
| Japanese apricot | 14,200 | 34.2 |
| Japanese persimmon | 11,000 | 5.9 |
| Vegetables (1975)** *** | | |
| Japanese radish | 590,544 | 35.7 |
| Turnip | 5,987 | 5.7 |
| Cucumber | 62,929 | 7.9 |
| Squash & pumpkin | 8,662 | 7.1 |
| Tomato | 372,535 | 43.2 |
| Immature corn | 63,295 | 38.7 |

*Satsuma mandarin & peach; canned products & juice, apple; canned products, jam & juice, grape; wine & juice, sweet cherry; canned products, Japanese apricot; pickles, Japanese persimmon; dry fruits.

**Japanese radish, turnip & cucumber; pickles, squash & pumpkin; frozen products, tomato; juice, ketchup, paste, puree & canned products, immature corn; canned & bottled products.

***In addition, asparagus, green peas, mushrooms bumboo shoots are canned or bottled and beans, peas, corns, carrots and spinaches are frozen. Chinese cabbages and eggplants are used for pickles.

## KOREA

### Korean Society

The Korean Society for Horticultural Science which was established in 1963 has now 450 members. Two times a year a horticultural congress is hold; in spring and autumn. Members are informed through the Journal of the Korean Society of Horticultural

Science which is published in two volumes per year. The present president is Dr. Hyun Koo Pyo, Professor of Vegetable Crops. His address is Department of Horticulture, College of Agriculture, Seoul National University, Suweon 170, Korea.

## NEW ZEALAND

**Retirement**

On June 1, Mr. W. R. Boyce, Director of the Ministry of Agriculture & Fisheries, Levin Horticultural Research Centre, retired after 25 years in charge of the centre. During this time Rud Boyce has seen the research station develop from 12 ha and 20 staff housed in old army huts, to more than 100 hectares and up to 150 staff housed in a modern office/laboratory complex. Undoubtedly much of this development has been due to his dedication and enthusiasm.

After completing an M. Sc. at Canterbury in 1939, Rud Boyce began his professional career with the Botany Division of D.S.I.R. working on New Zealand Flax (*Phormium* spp) an important fibre crop. In 1955 he became Superintendant (later Director) of the Levin Horticultural Research Station where he initiated a programme of development which has resulted in Levin becoming the major Horticultural Research Centre in New Zealand. Horticulture in New Zealand is moving into an exciting phase, in terms of beginning to realise export potential. Many farmers are now recognising the potentially high returns per hectare possible from horticulture, and are diversifying into a wide range of horticultural crops. The foresight of Mr. Boyce in developing the Centre to its current staffing of 19 scientists and 41 technicians will play a major role in the future development of horticulture in New Zealand.

**New Division**

Due to the dramatic upsurge in horticultural activity in New Zealand the Department of Scientific and Industrial Research (D.S.I.R.) has responded to the strong demand from all sections of the industry, and established a Division of Horticulture and Processing. The new Director of this Division is Dr. R. L. Bieleski, whose main research has been in plant nutrition, particularly emphasising phosphorous. The new division will be based at the Mount Albert Research Centre of the D.S.I.R. at Auckland.

☐ Dr. Allan Rae has been awarded a personal Chair in the Department of Agricultural Economics and Farm Management at Massey University. Professor Rae graduated B. Hort. Sc. in 1966 and M. Hort. Sc. in 1969 from Massey University. At this stage he developed a strong interest in the economics of horticultural production, and in particular the application of mathematical programming procedures to the problems of horticultural managements decision making. In 1972 he graduated Ph. D. from the University of New England (Australia), where he studied the integration of statistical decision theory and mathematical programming, because of the importance of recognising risk in horticultural management.

Returning to Massey University, Professor Rae developed courses in Horticultural Management and Horticultural Economics. He is the author of a text book 'Crop Management Economics' which is used in these courses, and reflects many of his earlier research interests. His current research includes the analysis of market structures and performance, and marketing policy.

Professor Rae is a member of ISHS, and has attended symposia of the Horticultural Economics Commission in 1975 and 1977. A sabbatical leave in 1977/78 based at Wye College (U.K.) and the Agricutural University of Sweden enabled him to visit many research institutes in Europe.

M. A. Nichols, Massey University, Palmerstone North.

## NETHERLANDS

☐ At the Sprenger Institute at Wageningen 7 participants from Turkey, Iracq, Iran, Bangladesh, Birma and Thailand have followed a course on processing of fruits and vegetables. Mango-fruits were conserved as juice sec or combined with pieces of fruit, beans were processed in tins and glasses, while onions were dried. After this the quality was judged of the treated fruits and vegetables.

Dr. Rud Boyce, New Zealand

☐ On May 28 and 29, 1980 the annual horticultural days organized by the Ministry of Agriculture and Fisheries has been held at Wageningen. This is the biggest gathering of all governamental officers in horticulture.

☐ As a result of deliberations between the managements of the Bulb Research Centre (LBO) at Lisse and the Government Institute for Research on Varieties of Cultivated Plants (RIVRO) at Wageningen a RIVRO-department for variety-cultivar-testing of flowerbulbs has been founded at the 1st of April 1980.

This department shall be located at the LBO at Lisse. Mr. H. P. Pasterkamp, of the Horticultural Extension service for flowerbulbs at Lisse, will be appointed as head of the department.

☐ At the Bulb Research Centre at Lisse very efficient new facilities came ready. They compromise a complex of 49 small units which are stured by computers. Besides research on bulbs much attention will be paid to the cut flowers and their longevity.

☐ At the Research Station for Arboriculture a new director was appointed viz. Mr. W. J. Bosch; he also will be advisory officer for nurseries with woody plants.

H. Jonkers, Agric. University, Wageningen.

New facilities of the Bulb Research Centre at Lisse, Netherlands

## TAIWAN

**Genebank**

'Taiwan Agricultural Research Institute has

recently established their germ-plasm bank for fruit crops. The bank would like to offer or exchange their propagated materials and related publications. Any futher information, please contact: Dr. Shue-cheng Lin, Dept. of Horticulture, Taiwan Agric. Res. Inst. Wu-feng, Taichung, Taiwan 431, Republic of China.'

## THAILAND

**From opium to food**

The drug control programme of the Government of Thailand-working with the United Nations Development Programme (UNDP) – will try to convince almost 1,900 farmers who cultivate 3,200 hectares that they can grow rice and kidney beans as profitably as the opium poppy, the source of morphine and heroin.

By showing the farmers of the Thai highlands how they can grow other income-producing crops and by providing the credit and marketing techniques that they need to turn a profit, the project seeks to reduce poppy cultivation significantly.

No one underestimates the difficulties that the project faces but on balance they are not as serious as the problems caused by the illicit substances produced from the poppy.

Thailand itself has to care for over 400.000 persons who are drug addicts. The 60 tons of heroin that are produced annually from the 'Golden Triangle' region of South-East Asia – where the frontiers of Burma, Laos and Thailand converge-disrupt societies in all parts of the world.

In the Thailand highlands alone, 12,000 acres are under illicit opium poppy production with 300,000 hill tribe people depending on the crop for their livelihood. 'The task is not simple, nor can it be accomplished in a brief period of time', said UNDP project adviser, Richard Mann. 'Crop replacement in these remote mountain areas of northern Thailand implies profound transformation of the whole complex of social and economic factors. For example, the isolation and poverty of the hill tribes make them vulnerable to the pressure of money-lenders, traffickers and others who profit from opium production.'

To help change the social and economic conditions that contribute to the cultivation of the opium poppy, three well-trained extension workers lived in five key villages to gain the trust and respect of the farmers. As they tested and demonstrated the new crops and farming techniques, slowly they influenced other villages to join in.

Soon, the workers and farmers were able to show that a combination of food and cash crops offered an attractive alternative to the opium poppy. On 480 hectares they successfully produced rice, kidney beans, high-grade coffee, off-season vegetables, fruit trees and medicinal plants. Farmers wishing to grow these new crops received credit through the project to buy the fertilizers, seeds and agricultural tools needed for production.

Since the crops were new to the region and no marketing structure existed for them, the project set up a special fund that purchased from the farmers any crops they could not sell. This guaranteed the farmers a floor price for their agricultural goods, and the fund replenished itself by selling the produce to the private sector.

Source: Development Forum, May 1980.

## UNITED KINGDOM

**Conferences, meetings**

□ Over 8000 people attended the National Farmers' Union British Growers Look Ahead Conference & Exhibition held in Harrogate in February. The Exhibition was opened by His Royal Highness, Prince Philip, who spoke about the application of new technology to horticulture. The principal Conference contribution was the Eric Gardner Memorial Lecture given by Dr. D. W. Robinson, Director of the Kinsealy Research Centre, Dublin. Dr. Robinson spoke about the challenges and opportunities of horticulture in the 1980's.

There were nearly 500 exhibitors including horticultural research institutes. Long Ashton Research Station, Bristol, demonstrated work on biological control of silver leaf using *Trichoderma viride*. East Malling Research Station had an exhibit on the new dwarfing apple rootstock M. 27, with both ornamental and fruiting cultivars. The response of carnations and begonias to day length treatment was the subject of Glasshouse Crops Research Institute exhibit. The mechanisation of protective crop cold production by means of travelling gantries was featured by the National Institute of Agricultural Engineering. The exhibit included a scale model of gantries in a multi-span glasshouse: this showed mechanical cultivation and the elevating mechanism for lettuce harvesting. The Weed Research Organization, Oxford, had an exhibit featuring six new herbicides for strawberries.

**People**

□ P. R. Thoday, University of Bath, has received a research grant for work on crops and crop husbandry appropriate to horticultural units for mentally handicapped people.

□ At the Annual General Meeting of the Horticultural Education Association at Brighton in April, Mr. W. J. Wright, ADAS Regional Vegetable Adviser for the Eastern Region, was elected President of the Association. He takes over from Dr. L. C. Luckwill, lately Assistant Director of Long Ashton Research Station.

□ Mr. J. L. Glazebrook of Pershore College of Horticulture has retired as Honorary General Secreatary of the Horticultural Education Association after 12 years in office. There have been only three General Secretaries since 1931. Mr. Glazebrook took over from Mr. Eric Hobbis who is well known to horticulturists throughout the world. Unfortunately Mr. Hobbis's health is poor and he has been in hospital for some months. The new General Secretary is Mr. V. Fowler, lecturer in the Department of Applied Biology, University of Bath.

**Miscellaneous**

□ The Commonwealth Agricultural Bureaux abstracts database became available on the European Space Agency's Information Retrieval Service (IRS) in October 1979. The full file contains over one million records from 1972/73 and is accessible throughout Europe. Details regarding price will be available shortly. A demonstration was given in Rome on 13th December 1979 at FAO.

This important new access point to the CAB database is another stage in the general policy of making CAB Abstracts widely available. An experimental file is scheduled to be available on SDC's ORBIT system early in 1980 and the CAB file will soon be available through DIMDI in Europe. Training sessions for the use of CAB Abstracts on these systems are now being planned. For further information or advice on using CAB Abstracts or gaining access to IRS, DIMDI, SDC, etc. please contact: Mr. M. Furneaux, Training Officer, Commonwealth Agricultural Bureaux, Farnham House, Farnham Royal, Slough SL2 3BN, UK.

□ The British Agrochemicals Supply Industry Scheme Limited, BASIS, is an independent registration scheme for distributors of crop protection products cleared by the Pesticide Safety Precaution Scheme, PSPS, within the United Kingdom. It was started by the trade organisations in the crop protection industry with government encouragement. Professor L. Broadbent of the University of Bath is Chairman of this body.

The main aim of BASIS is to help British agriculture, horticulture and forestry by raising gradually the standards within the pesticide distribution industry. The Scheme will help to ensure a high level of safety in the storage, distribution and application of crop protection products, and that those selling, applying, or advising on the use of such products are adequately trained in pesticide efficacy and safe usage.

There is a registration board of management made up of the following Directors: a chairman independent of the industry, three nominees of the UK Agricultural Supply Trades Association, one nominee of the National Association of Agricultural Contractors, three nominees of the British Agrochemical Association, and one nominee of the National Farmers' Union. Further information on this scheme can be obtained from The Secretary, BASIS, 3 Whitehall Court, London, SW1A 2EQ.

□ The National Seed Development Organisation (NSDO) in its report for 1978/79 shows that it contributed nearly £ 2,000,000 to State funds from dividends and shared royalties, and this is an increase of nearly £ ½ m on the previous year. NSDO's function is to promote the marketing and use of cultivars from State aided institutes. NSDO is establishing a new seed testing laboratory and micropropagation unit to meet the demand for plant material. Strawberries, hybrid lilies, apple and cherry rootstocks, cauliflower and anemones, are among the many plant materials now being handled.

□ A second Government Award has been made to the inventors of synthetic pyrethroids. The Agricultural Research Council has approved awards to Dr. M. Elliott and Dr. N. Janes of Rothamsted Experimental Station for their discovery of the outstanding potent, non-persistent safe insecticides resmethrin and bioresmethrin. The award is being paid by the National Research Development Corporation (NRDC) from its income from the commercial manufacturers of the new insecticides. The new products are man-made relatives of natural insecticides, the pyrethrins, found in a daisy-like flower *(Chrysanthemum cinerariaefolium)*. In a long-term research project in Rothamsted's Insecticides and Fungicides Department, supported by the Agricultural Research Council, workers have been studying what it is that makes this group of insecticides so deadly. They sought to increase the insecticidal activity of the natural compounds while keeping them safe to mammals. NRDC established patent protection for the insecticides which were then successfully licenced to a number of leading companies in the UK and overseas. Synthetic pyrethroids illustrate the practical benefits which can be achieved by investment in a long-term programme of fundamental research.

□ A 'bank' for vegetable seeds is to be established at the National Vegetable Research Station, Wellesbourne. The main aim of this facility is to store on a long-term basis a seed collection of genetic material from different parts of the world. The collection will be unique in catering for the neglected and more difficult vegetable species, which are nevertheless important sources of food.

The venture arises from an initiative by OXFAM who have guaranteed the capital needed and the running costs for the first seven years by a special appeal set up by OXFAM.

Building work has now started which will provide for the long-term storage of seed of at least 12,000 different vegetable varieties in a cold room run at —20°C. Although there are ancillary features (one heated glasshouse and two cold) for the regeneration of seed of temperate vegetable crops, seed of tropical vegetables will only be stored at Wellesbourne. NVRS scientists will undertake observation on a range of characters of economic importance and a computer-based data storage and retrieval system will enable plant breeders throughout the world to obtain information and seed from the Wellesbourne collection.

WESTERN SAMOA

**Multiple cropping**

In Western Samoa multiple cropping and intercropping are widespread used, combining long term, medium term and short term crops. A trial is set up using coconut, cacao, banana, tara and several vegetables. Supporting ideas on this topic are appreciated and contact can be made with R. Jones, University of South Pacific School of Agriculture, Apia, Western Samoa.

# Books

The *Proceedings of the 1978 Meeting of the International Society of Citriculture* are now available. It comprises 348 pages and 102 papers given in the following chapters: Present and future prospects of world citrus; quality control of fruit and product; taxonomy, breeding and genetics; cultural and environmental factors; harvesting and marketing; rootstocks and nurserey practice; control of pests; diseases and their control; soil management and herbicide use; irrigation, drainage and salinity; crop regulation; nutrition; control of tree size, shape and density; incorporation of new developments into citrus management.

The publication includes also names and addresses of members in 61 countries.

Copies can be obtained from the Editor, 1978 Proc. Int. Soc. Citriculture, P.O. Box 1988, Griffith, NSW 2680, Australia. The cost per copy is $ 25.00 (Australian) or $ 27.50 (U.S.), costs for surface mail included.

*Leafy Salad Vegetables.* Published information on leafy salad vegetables is widespread and scattered. In his book on these vegetables, Edward J. Ryder, Plant Geneticist of the US Agricultural Research Station at Salinas brings together up-date information on lettuce, celery, cabbage, endive, chicory, spinach, and several less often used vegetables for salads. For each species the book is amply referenced for further study (lettuce has already 233 references). There is no discussion of primarily tropical leafy vegetables. The book is published by Avi Publishing Company, Inc., Westport, Connecticut, USA-Price: US $ 22.00.

A sixth edition of *'The Pesticide Manual'* edited by C. R. Worthing has been published by the British Crop Protection Council. This edition, like its predecessors, contains detailed basic information on chemicals and microbial agents used as active components of products for the control of weeds, crop pests and diseases, as well as details of growth regulator chemicals. This new and complete revised edition contains 525 compounds in the main section, and four separate indexes. It is available, post free UK, price £ 20.00 from BCPC Publications Sales, 'Shirley', Westfields, Cradley, Malvern, Worcestershire WR13 5LP, England.

A new book in the Science in Horticulture series, *Plant Breeding and Genetics in Horticulture*, by Dr. C. North, formerly Head of the Plant Breeding Section, Scottish Horticultural Research Institute, Dundee, has been published by Macmillan at £ 4.95. This book is intended as a textbook for horticultural students.

# Meetings, Symposia, Congresses

## ISHS MEETINGS

**VIIth International Symposium on Apricot culture and decline**

*Place:* Bucharest, Romania

*Date:* 15–21 July, 1981

*Sponsored by:* Ministry of Agriculture and Food Industry, Romania in co-operation with the International Society for Horticultural Science, Fruit Section, Working Group on Apricot Culture and Decline.

*President of the Symposium:* Prof. Dr. Staniša A. Paunović, Agronomic Faculty, Cara Dušana 34, 32000, Čačak, Yugoslavia.

*President of the Organizing Committe of Romania:* Prof. Dr. Ion Ceausescu, Deputy Minister of Agriculture and Food Industry, Romania.

*Secretariat of Symposium and Information:* Trustul Pomiculturii Pitesti-Maracineni 0300, Romania

*Programme:* The symposium will deal with the following subjects: 1. Ecology and physiology; 2. Genetics and breeding; 3. New technologies in apricot growing; 4. Pests and diseases; 5. Economic aspects; 5. Processing technologies.

*Papers:* Participants who wish to present a paper should send the title of their report to the Secretariat of the symposium as soon as possible. Abstracts should be send before the end of October. Papers will be published in Acta Horticulturae according the 'Instructions to Authors', which can be obtained from the Secretariat. Papers should be written in English.

*Languages:* English, French and Russian. Simultaneous translation will be provided.

*Excursions:* Professional tours and a 'Ladies programme' will be organized.

**Fourth Symposium in Timing of Fieldproduction of Vegetables**

*Place:* Nyborg, Funen, Denmark

*Date:* 27–31 July, 1981

*Organization:* State Research Centre for Horticulture at Aarslev under aegis of the Commission for Vegetables

*Theme:* Timing of the production of field vegetables

*Papers:* Contributed papers in English are invited on a topic which relates to the main theme. The papers should not exceed a

lenght of 15 minutes. Decissions on grouping the papers will be made later.
*Abstracts:* Abstracts will be distributed to all participants.
*Accomodation:* Strandhotel Nyborg, at Nyborg
*Conference fee:* Appr. Dkf. 800.—
*Information:* Mr. Johs. Jensen, Institute for Vegetables, Kirstinebjergvej 6, DK–5792 Aarslev, Denmark. Tel. 09–991766

**Symposium on Chrysanthemum**
*Place:* Ecole Nationale Supérieure d'horticulture, Versailles, France
*Date:* August 11–13, 1981
*Scope:* The main subjects are propagation, physiology, nutrition, genetics, production, economy and plant protection.
*Papers:* Papers (15–20 min.) may be presented in French or English. Simultaneous translation will be provided.
*Excursions:* There will be an one day professional excursion.
*Information:* Prof. P. Lemattre, Ecole Nationale Supérieure d'Horticulture, 4 rue Hardy, 78000 Versailles, France

**Third International Symposium on Watersupply and Irrigation in the Open and under protected Cultivation**
*Place:* Wageningen, The Netherlands
*Date:* March 1–7, 1981
*Organizers:* Sections for vegetables, ornamentals and fruits and the Commission for protected cultivation
*Scope:* Exchange of information in new ideas and developments on water supply and irrigation problems of horticultural crops.
*Topics:*
Water quality
– response on yield and marketable product
– specific ion effects
– theoretical aspects and causes of salinisation
– requirements for water quality and pollution
Water quantity
– water uptake and water transport
– internal plant water relations
– transpiration, photosynthesis and growth
– physiological disorders
Water application
– consumptive use
– timing amount and frequency of irrigation
– technical equipment and specific requirements
– economical consequences
*Participation fee:* Dfl. 200 including proceedings, excursions and social events
*Accomodation:* In Wageningen and surroundings. Price for bed and breakfast Dfl. 50.00 per day.
*Language:* English
*Information:* Mrs. W. A. Wagenvoort, Department of Horticulture, Agricutural University, P.O. Box 30, 6700 AA Wageningen, the Netherlands

**4th Symposium on Growth Regulators in Fruit Production**
*Place:* Cornell University, Ithaca, N.Y., U.S.A.
*Date:* June 21–24, 1981
*Organizer:* Working Group on Growth Regulators in Fruit Production
*Scope:* This symposium will cover growth regulators, basic and applied, in all sorts of fruit
*Details:* This symposium will be preceeded by the joint meeting of the American Society of Plant Physiologists with the Canadian Society of Plant Physiologists at Laval University, Quebec City, Canada. Some people may wish to attend both meetings.
*Info:* Inquiries should be sent to the secretary of the Working Group: Dr. Henk Jonkers, Department of Horticulture, Agricultural University, P.O. Box 30, 6700 AA Wageningen, The Netherlands.

## NON-ISHS MEETINGS

**Fourth International Citrus Congress**
*Place:* Tokyo, Japan
*Date:* November 9–14, 1981
*Organization:* International Society of Citriculture
*Papers:* The program will consist of invitation papers supplemented by contributed papers. Section chairman are compiling each section's program. Those wishing to contribute papers should contact the appropriate section chairman. If too numerous, restrictions may be necessary.
*Sections and Section Chairman*
Section 1. Genetics, Breeding & Propagation; Dr. M. Iwamasa, Faculty of Agriculture, Saga University, 1-Honjo-machi, Saga-shi, 840 Japan.
Section 2. Physiology & Ecology of Plants; Dr. E. Yuda, Faculty of Agriculture, Oosaka University, 4-chome, Mozu-umemachi. Sakai-shi, Oosaka-fu, 591 Japan.
Section 3. Cultural Practices: Dr. S. Iwahori, Faculty of Agriculture, Kagoshima University, 1-chome Korimoto, Kagoshima, 890 Japan.
Section 4. Diseases; Dr. T. Miyakawa, Tokushima Fruit Tree Research Station, Katsu-ura-machi, Katsu-ura-gun, Tokushima-ken, 771–13 Japan.
Section 5. Insect Pests & Mites; Mr. R. Korenaga, Okitsu Branch, National Fruit Tree Research Station, Okitsu-nakamachi, Shimizu-shi, 424–02 Japan.
Section 6. Postharvest Problems; Dr. H. Kitagawa, Faculty of Agriculture, Kagawa University, Mikimachi, Kida-gun, Kagawa-ken 761–07 Japan.
Section 7. Processing & Byproducts; Dr. S. Itoo, Faculty of Agriculture, Kagoshima University, 1-chome, Korimoto, Kagoshima, 890 Japan.
*Symposium on World Citrus Industry.* Supervisor: Prof. T. Oohata; Editing Chairman: Prof. Dr. Kazuo Matsumoto, Faculty of Agriculture, Ehime University, 3-5-7 Tarumi, Matsuyama-shi, 790 Japan.
*Rules for submission of papers*
1. At least one author must be member of ISC and pre-registrant.
2. Manuscript must conform with the Instructions to Authors available from the appropriate section chairman.
3. The Reviewing Committee reserves the right to reject an unsuitable manuscript or to suggest minor changes.
4. An English abstract of approximately 300 words must be received by the appropriate section chairman before May 1, 1981.
5. Completed manuscripts must reach the section chairman before October 1, 1981 to be available for simultaneous translation.
6. Manuscripts must be in English.
*Membership dues:* ($10.00 (U.S.) Covers the period from the Australian Congress, August, 1978 to end of the 1981 Japan Congress. ISC dues should be sent with the attached form to Dr. H. D. Chapman, Secretary-Treasurer of ISC, Department of Soil & Environmental Sciences, University of California, Riverside, California, 92521. U.S.A.
*Registration Fee:* $100.00 (U.S.) (subject to change due to inflationary circumstances.) Covers opening session, reception, program sections, distribution of one copy each of Abstracts and Proceedings. $110.00 after August 30, 1981.
*Spouse Fee:* $35.00 (U.S.) Includes opening session, reception & ladies' program.
*Field Tour:* Post-Congress tours to western Japan are being planned following the one-day tour to Shizuoka. Please advise time period and area preference.
*Info:* In order to ensure being included in the mailing list for circulars and newsletters, you are requested to write to the Secretariat, Mr. Masao Nishiura, Secretary General of 4th Congress, Okitsu Branch, National Fruit Tree Research Station, Okitsu-Nakamachi, Shimizu-shi, 424–02 Japan.

**XI International Scientific Congress on the Cultivation of Edible Fungi**
*Place:* Sydney, Australia
*Date:* August 14–19, 1981
*Theme:* Practical mushroom growing in the 1980's.
*Schedule:* general sessions on August 15 and 16; scientific sessions August 17 and 18. There will be featured keynote speakers, submitted papers, poster sessions and discussion periods.
*Call for papers:* Papers pertaining to all edible fungi will be welcome. Papers will be called for in both the general and scientific sessions in the following subject areas:
farm design and machinery
composting
spawn
casing
cropping
diseases and pests
pesticide resistance
industrial mycology
marketing
*Information:* For information on any aspect of the congress write to: The XI Congress Secretariat, GPO Box 2609, Sydney NSW, Australia 2001.

**Thirteenth International Botanical Congress**
*Place:* Sydney, Australia
*Date:* August 21–28, 1981

*Sponsor:* Australian Academy of Science
*Programme:* The Programme will consist of 12 sections – molecular, metabolic, cellular and structural, developmental, evironmental, community, genetic, systematic and evolutionary, fungal, aquatic, historical ánd applied botany. There will be plenary sessions, symposia, and sessions for submitted contributions (papers and posters). Chairman of the Programme Committee: – Dr. L. T. Evans.
*Info:* Executive Secretary 13th IBC, Dr. W. J. Cram, University of Sydney, N.S.W. 2006, Australia

**VIIIth Intern. Congress Plastics in Agriculture**
*Place:* Lisboa, Portugal
*Date:* October 6–11, 1980
*Organizers:* Associaçao Portuguesa de Plasticos para a Agricultura and Comité International des Plastiques en Agriculture
*Scope:*
The Congress will be subdivided into some *major fields*, for instance:
– plastics as materials for agricultural construction;
– technics of development in plasticulture;
– plastics in packing, conservation and transport of agricultural products;
– economical and social aspects of plasticulture… It will also deal with *some specific fields*, f.i.
– plastic mulch;
– plastic shelters (construction and climate);
– plastics in management of hydraulic resources (watering, drainage, hydroponics, water reserves…);
– plastics and solar energy
– new materials and new *applications* of plastics in horticulture…
*Information:*
Full details of the programme and further informations about the Congress are available from:
– Pedro Febrer, President of C.I.P.A. and A.P.P.A., rua da Junqueira, 299 P.–1300 Lisboa (Portugal) Tél.: 63.70.23; Télex: 14103 Epsil X P.
– Or A. Nisen Liaison Officer between I.S.H.S. and C.I.P.A., Avenue de la Faculté d'Agronomie 2, B 5800 Gembloux (Belgium), (Tél. 081/61 29 61 to 66 Post 45).

**First International Symposium on Sweet Potato**
*Place:* Taiwan Agricultural Research Institue, Taichung, Taiwan
*Date:* March 23–27, 1981
*Coordinator:* Dr. Ruben L. Villareal
*Scope:* This symposium will deal with papers on:
– origin and history
– fertilizer nutrition
– pests and diseases
– mechanization
– breeding for industry
– storage, marketing and utilization
as wel as on many other aspects of this important and undervalued crop.
*Information:* Further details on the programme, submission papers, booking arrangements can be obtained from the coordinator, P.O. Box 42, Shansua, Tainan 741, Taiwan, China

**11th International Course on applied Plant Breeding**
*Place:* Wageningen, the Netherlands
*Date:* March 17–June 26, 1981
*Organizer:* International Agricultural Centre
*Objective:* The main objective of the course is to provide participants with training in practical methods of plant breeding in general and of annual crops in particular. For a better understanding of practical plant breeding, the scientific fundamentals will also be dealt with. Some tests will be include in this part. Much attention will be paid to 'self-activity' of the participants in practicals, and to breeding programmes of research institutes and private firms.
The course – which is at B.Sc. level – is intended for plant breeders, mainly from developing countries, who have not recently had the opportunity to acquaint themselves with modern plant breeding techniques.
Only some attention is given to related fields such as variety research, and the introduction and distribution of high quality seed and plant material.
*Programme:*
1. Basic disciplines and introduction to plant breeding: genetics, cytological techniques, pollination and fertilization, fundamentals of plant breeding, selection methods, practical training in breeding techniques, design of a breeding programme.
2. Design and statistical analysis of experiments.
3. Breeding for disease and pest resistance: general introduction, techniques used in disease research, disease resistance in practical breeding programmes, pathogenic cultures for testing, disease assessment.
4. Variety research, seed multiplication and distribution: variety testing and evaluation, seed production, field inspection, seed testing, certification of seeds and plant material.
5. Miscellaneous subjects: genetic resources, mutation breeding, tissue and organ culture.
6. Breeding of crops: a number of breeding programmes, as carried out by institutes and breeding firms are presented in an optional programme and during organized excursions.
7. Excursions to various parts of The Netherlands, breeding stations, research institutes and private firms.
8. Library/study: time is reserved for visits to libraries of the Agricultural University and institutes of research in plant breeding.
*Information:* Director IAC, P.O. Box 88, 6700 AB, The Netherlands

**International Colloquium on Increasing of the effectiveness of agricultural production by means of plastics**
*Place:* Kecskemét, Hungary
*Date:* June 24–26, 1981
*Organizers:* Hungarian Association of Agricultural Sciences
*Scope:* The role of plastics in plant growing, water management, animal husbandry and storage
*Papers:* Papers of 10 minutes can be read. Translation in Hungarian will be provided.
*Excursions:* Field trip to demonstration sides and special exhibition.
*Information:* Dr. István Filius, University of Horticulture, College Faculty of Kecskemét, Erdei Ferenc tér 1, H–6000,Kecskemét, Hungary

**11th International Course on Vegetable Growing**
*Place:* Wageningen, the Netherlands
*Date:* August 11–November 13, 1981
*Organization:* International Agricultural Centre
*Objectives:* To refresh knowledge and to give information on various aspects of commercial vegetable production, research and extension work in related fields. The course is intended for university trained specialists mainly from developping countries.
*Programme:* The programme comprises lectures, practical training, demonstrations, discussions and exursions on: climate and soil factors, seeds, seedling production, variety testing, soil fertility, horticultural engineering, plant protection, postharvest handling, horticultural economics, a.s.o.
*Fellowships:* Financial aid may be given by Netherlands Government, European Common Market, FAO, UN, Unesco. More information is given in the IAC information leaflet.
*Information:* Detailed information is given by International Agricultural Centre, P.O. Box 88, 6700 AB, Wageningen.

**Floriade 1982**
*Place:* Amsterdam, the Netherlands
*Date:* April 8–October 10, 1982
*Situation:* Floriade '82 will be laid out in the south-eastern part of Amsterdam, along the banks of the Gaasperplas.
Owing to the fact that the water of this bogpool has been so diverted that it reaches the heart of the exhibition site, visitors will be able to see, at several points, typical stretches of Dutch reclaimed land, the famous polders with their marvellous vegetation which can hold its own with the finest specimens of exotic plant communities exhibited elsewhere on the site.
The total available space has been intensively compartmentalized; it will be greatly variegated as a result of differences of level and individual soil adaptations. This made it possible to create microclimates and horticultural conditions permitting a wide variety of cultivated plants and self-sown plants.
This 125-acre park-landshape will contain millions of flowers, trees and plants, as well

as vegetables and fruits produced by the world's best cultivators, all in glasshouses and in the large hall reserved for the alternating indoor show.

*International participation:*

Floriade '82 will not only provide conclusive evidence of Dutch know-how in the field of ornamental plant cultivation and foods crops. Foreign participants will so find sufficient room and facilities to demonstrate the high level of their products which will be conveniently arranged and in optimum condition.

*Information:*

Information concerning participation and visits: Floriade '82, Provincialeweg 24, 1108 AB Amsterdam Z.O. Holland, Tel. 020–96.68.58

## Calendar of Events

– *January, 1981, Brazil:* Comm. Tropical and Subtropcal Horticulture: Joint meeting with Brazilian Society of Fruit Culture and Embrapa. Info: Dr. D. C. Giacometti, Embrapa/Cenargen, C.O. 10.2372, CEP 70.000 Brasilia DF, Brazil.

– *March 1–10, 1981, Netherlands:* Section Vegetables ornamentals and fruit, Comm. for Prot. cultivation: Symposium on Water supply and irrigation. Convener: Prof. Dr. J. F. Bierhuizen, Dept. of Hortic., Agric. University, P.O. Box 30, 6700 AA Wageningen, Netherlands.

– *Spring, 1981, Yugoslavia:* Commission Labour and Labourmanagement: Symposium on Labour and Labourmanagement. Secretary: Dr. V. Simonić, Faculty of Agricultural Science, Inst. for Economics and Organization of Agriculture, Simunska 25, 41000 Zagreb, Yugoslavia.

– *June 21–24, 1981, Ithaca (USA):* Section Fruits: Symposium on Growth regulators in fruit production. Info: Dr. H. Jonkers, Dept. of Hortic., Agric. Univ., P.O. Box 30, 6700 AA Wageningen, Netherlands.

– *July, 1981, Ibadan (Nigeria):* Comm. Tropical and Subtropical Horticulture: Sixth Africa Symposium on Horticultural Crops. Subject: African fruits and vegetables. Info:- Prof. H. D. Tindall, Nat. Coll. of Hortic. Education, Silsoe, Bedford MK45 4TD, England.

– *July 15–21, 1981, Bucarest (Romania):* Section Fruits: Symposium on Apricot culture and decline. Secretariat: Trustul Pomiculturii, Pitesti-Mărăcineni 0300, Romania.

– *July 27–31, 1981, Aarslev (Denmark):* Section Vegetables: Symposium on Timing of field production of vegetables. Conveners: M. Blangstrup Jorgensen and Joh. Jensen, Statens Forsøgsstation, D 5792 Aarslev, Denmark.

– *August 11–13, 1981, Versailles (France):* Section Ornamental Plants, Commission Protected Cultivation: Symposium on Protected cultivation of chrysanthemums (propagation, flower physiology, nutrition). Convener: Prof. Pierre Lemattre, Ecole Nat. Sup. d'Horticulture, Chair de Cultures Ornementales, 4 rue Hardy, 78000 Versailles, France.

– *September 7–12, 1981, Warsaw (Poland):* Section Vegetables: Symposium on the use of fertilizer in intensive vegetable production under covers. Info: Prof. Dr. O. Nowosielski, Research Institute of Vegetable Crops, ul. 22 Lipca 3/5, Skierniewice, Poland.

– *September 1981, Sydney (Australia):* Section Ornamental Plants: Symposium on Propagation of Ornamental Plants. Convener: Mr. W. F. Walker, 5 Primrose Place, Sandy Bay, Hobart 7005, Tasmania, Australia. Info: W.-U. v. Hentig, Institut für Zierpflanzenbau, Postfach 1180, D–6222 Geisenheim, Germany Fed. Rep.

– *August 29-September 4, 1982, Hamburg (Fed. Rep. Germany):* XXIst International Horticultural Congress, Secretariat: Hamburg, Congress Centre, P.O. Box 302360, D-2000 Hamburg 36, B.R.D.

– *May 1983, probably San Diego, Cal. (USA):* Section Ornamental Plants, Commission Protected Cultivation: Symposium on Protected Cultivation of Carnations. Info: Dr. S. T. Besemer, Bldg. 4, 5555 Overland Ave, San Diego, Cal. 92123, USA.

– *1983, Aarslev (Denmark):* Section Ornamental Plants: Symposium on Production Planning in Glasshouse Floriculture. Convener: Dr. V. A. Hallig, Glasshouse Crops Res. Station, Kristinebjergvej 10, DK 5792 Aarslev, Denmark.

NON–ISHS

– *December 13–15, 1980, Genoa, Italy:* Orchid Show and Market. Info: Fiera di Genova. P. le J. F. Kennedy, 16129 Genova, Italy.

– *December 15–19, 1980, Hyderabad (India):* International Pigeonpea Improvement Workshop. Info: International Crops Research Institute for Semi-arid Tropics (ICRISAT), Hyderabad, India.

– *March, 23–27, 1981, Shanhua, Taiwan:* International Symposium on Sweet Potato. Info: A.V.R.D.C. dr. R. L. Villareal, P.O. Box 42, Shanhua, Taiwan 741, Taiwan.

– *May 4–8, 1981, Utrecht (the Netherlands):* Symposium on Energy, resources and materials control techniques (sub-title: effects of these techniques on the environment). Info: Royal Netherlands Industries Fair, P.O. Box 8500, 3503RM, Utrecht, the Netherlands.

– *June 24–26, 1981, Kecskemét, (Hungary):* Intern. Coll. on increasing of the effectiveness of agric prod. by mesures of plastics. Info: Dr. I. Filius, University of Hort. College Faculty of Kecskemét, Erdi Ferenc tér 1, H–6000 Kecskemét, Hungary.

– *June 27–30, 1981, Oxford (U.K.):* ISPP Meeting on Plant Virus Diseases Epidemiology. Info: J. M. Thresh, East Mailing Research Stations, Maidstone, Kent, ME196BJ, England, U.K.

– *August 2–7, 1981, Strasbourg (France):* Fifth International Congress for Virology. Info: Prof. L. Hirt, Institute of Molecular and Cellular Biology, C.N.R.S., 15, Rue Descartes, 6700 Strasbourg, France.

– *August 16–23, 1981, Cali (Colombia):* Intern. Conf. on Plant Pathogenic Bacteria. Info: C. Lozano, CIAT, Apartado Aéreo 67–13, Cali, Colombia.

– *August 25–28, 1981, Bari, Italy:* Third Intern. Symposium on *Verticillium*. Info: Dr. M. Cirulli, Inst. di Patologia Vegetale, Via G. Amendola 165/A, Bari, Italy 70126.

– *August 21–28, 1981, Sydney, (Australia):* 13th International Botanical Congress. Contact: The Executive Secretary, Dr. W. J. Cram, University of Sydney, New South Wales, Australia 2006.

– *August–September, 1981, Hamburg, Germany Fed. Rep.:* Eucarpia Meeting on Rose Breeding. Info: L. D. Sparnaay, IVT, P.O. Box 16, Wageningen, The Netherlands.

– *September 1–7, 1981, El-Zazazig (Egypt):* First Int. Congress for Soil Pollution and Methods of Protection from Pesticid Residues. Info: Prof. dr. A. A. Abdel-Gawaad, El-Zagazic, Univ., El-Zazagig, Egypt.

– *September, 1981, Wageningen, The Netherlands:* Eucarpia Meeting on mutation and polyploidy. Info: C. Broertjes, ITAL, P.O. Box 48, Wageningen, The Netherlands.

– *November 9–13, 1981, Tokyo, Japan:* International Citrus Congress. Info: Mr. Masao Nishiura, National Fruit Tree Research Station, Okitsu-Nakamachi, Shimizu-shi, 424–02, Japan.

– *February 8–16, 1982, New Delhi, India:* Intern. Congress on Soil Science. Info: Dr. M. B. Bouché, Station de Recherches sur la Faune du Sol, 7 rue Sully, 21034 Dijon, Cedex, France.

– *March 1982, Kuala Lumpur (Malaysia):* Intern. Conference on Plant Protection in the Tropics. Info: MAPPS, P.O. Box 2351, Kuala Lumpur, 01–02, Malaysia.

– *July, 1982, Tokyo, Japan:* Fifth International Congress of Pesticide Chemistry. Info: Tomomasa Misato, Inst. of Physical and Chemical Research, 2–1 Hirosawa, Wakoshi, Siatama 351, Japan.

– *August 9–13, 1982, Boulder, Colorado, USA:* 9th Congress of the Intern. Union for the Study of Social Insects. Info: Dr. M. D. Breed, University of Colorado, Boulder, Colorado, USA.

– *August 22–27, 1982, Coventry, U.K.:* 9th Intern. Colloquium on Plant Nutrition. Info: Dr. B. J. Greenwood, National Vegetable Research Station Wellesbourne, Warwick CV35 9EF, U.K.

– *May–October, 1982, Amsterdam, The Netherlands:* Floriade, garden show.

– *August 17–24, 1983, Melbourne (Australia):* Fourth Int. Congress of Plant Pathology. Info: Dr. G. West, University of Melbourne, Botany School, Parkville 3052, Victoria, Australia.

– *1983, Wageningen, the Netherlands:* X Eucarpia Congress. Info: H. Lamberts, Foundation for Agricultural Plant Breeding, P.O. Box 117, Wageningen, the Netherlands.

– *1983, Hamburg, Germany Fed. Rep.:* IGA, Garden Show.

– *1984, Vienna, Austria:* WIG, Garden Show.

– *April, 1985, Ghand, Belgium:* Floralies gantoises.

ISHS

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*regional liaison secretary East Africa:* Dr. F. O. Lanphear, Department of Crop Science, Univ. of Nairobi, P.O. Box 30197, Nairobi, Kenya
*special advisor on mangoes:* Dr. S. K. Mukherjee, Coll. of Agric., Univ. of Calcutta, 35 Ballygunge, Circular Road, Calcutta-19, India

**Commission Amateur Horticulture**
*chairman:* Dr. H. B. Tukey, Jr., College of Forest Res., Univ. of Washington, AR-10, Seattle, WA 98195, USA
*vice-chairman:* Dr. H. B. Rycroft, National Botanic Gardens Kirstenbosch 7700, Newlands C.P., South Africa

## WORKING GROUPS

*Section for Fruits*
– Apricot culture and decline. Chairman: Prof. Dr. Ir. S. A. Paunović Agronomski Fakultet, 32000 Cačak, Srbija, Yugoslavia.
– Pears. Chairman: Prof. Fr. Scaramuzzi, Direttore dell'Instituto di Coltivazioni Arboree, Facoltà di Agraria, Piazzale delle Cascine, Firenze, Italy.
– Plum genetics and plum breeding. Chairman: Dr. R. Bernhard, Directeur de la Station de Recherches d'Arboriculture, Grande Ferrade, Pont-de-la-Maye, Gironde, France.
– Vaccinium culture Chairman: Prof. Dr. I. Fernqvist, Swedish Univ. of Agric. Sc., Department of Pomology, Alnarp S 230 53, Sweden.
– High Density Planting. Chairman: Dr. J. E. Jackson, East Malling Res. Station, East Malling, Kent ME 19 6BJ, U.K.
– Growth regulators in Fruit Production. Chairman: Dr. M. W. Williams, USA-ARS-WR, Tree Fruit Res. Lab. 1104 N. Western, Wenatchee, Wash, 98801. USA.
– Viticulture. Chairman: Dr. G. S. Randhawa, Director Institute of Horticultural Research, 255, Upper Palace Orchards, Bangalore–6, India.
– Citriculture. Chairman: Prof. H. D. Tindall, National College of Agricultural Engineering, Silsoe, Bedford MK 45 4DT, U.K.
– Juvenility in Woody perennials. Chairman North America: Dr. R. H. Zimmerman, USDA/SEA-AR, Hortic, Science Inst., Beltsville, Md. 20705. U.S.A.; Chairman Europe: Dr. T. Visser, Institute of Horticultural Plant Breeding, Mansholtlaan 15, 6700 AA Wageningen, The Netherlands.
– Rubus and Ribes. Chairman: Dr. H. A. Daubeny, Agriculture Canada, Research Station, 6660 N.W. Marine Drive, Vancouver B.C., V6T 1X2, Canada.
– Rootstock Breeding. Chairman North America: Dr. J. N. Cummins, Department of Pomology and Viticulture, New York, State Exp. Sta., Hedrick Hall, Geneva, N.Y. 14456, U.S.A. Chairman Europe/Russia: Prof. S. Zagaja, Res. Inst. of Pomology, 96-100 Skierniewice, Poland.
– Winter hardiness in woody perennials. Chairman Europe/Russia: Prof. Dr. T. Holubowicz, Inst. of Hort. Production, Pomology Section, Ul. Dabrowskiego 159, 60-594 Poznan, Poland; Chairman North America: Dr. R. E. C. Layne, Research Station, Agriculture Canada, Harrow, Ontario NOR IGO, Canada.

*Section for Vegetables*
– Timing of Field production of Vegetable Crops. Chairman: Dr. A. J. Gane, PGRO, Thornhaugh, Petersborough, PE8 6HJ, U.K.
– Vegetable Nutrition and Fertilization. Chairman: Prof. Dr. O. Nowosielski, Res. Inst. of Vegetable Crops, Ul. 22 Lipca 1/3, 96-100 Skierniewice, Poland.
– Post-harvest handling of Vegetables. Chairman: Dr. J. Apeland, Department of Vegetable Crops, University of Agriculture, 1432 AAS–NLH, Norway.
– Water supply and Vegetable irrigation Chairman: Prof. Dr. H. D. Hartmann, Inst. für Gemüsebau, Forschungsanstalt für Weinbau, Gartenbau, Getränketechnik und Landespflege, Geisenheim (Rheingau) F.R.G.
– Vegetable Quality. Chairman: Dr. Torsten Nilsson, University of Agricultural Sciences, S 230 53 Alnarp, Sweden
– Vegetable Seed Production: Chairman: Dr. R. A. T. George, University of Bath, Claverton Down, Bath BA2 7AIJ, UK.
– Spice Crops and Medicinal Plant Production: Prof. Dr. Peter Tétényi, Research Institute for Medicinal Plants, H-2011 Budakalász, Hungary.
– Production of Vegetables for Processing. Chairman: Prof. Dr. V. E. Rubatzky, Dept. of Veg. Crops, Univ. of California, Davis, CA 95616, USA.
– African Indigenous Vegetables: Chairman to be appointed.

*Commission for Protected Cultivation*
– Methodology of Research on Protected Cultivation. Chairman: Prof. Dr. H. D. Krug, Herrenhauserstrasse 2, 3 Hannover-Herrenhausen, Germany F.R.
– Greenhouse Climate. Chairman: Dr. J. Damagnez, Station de Bio-Climatologie, 84140 Montfavet, France.
– $CO_2$ Nutrition. Chairman: Ir. N. v. Berkel, Glasshouse Crops Res. and Exp. Station, Zuidweg 38, Naaldwijk, Netherlands.

*Commission for Horticultural Nomenclature and Registration*
– Nomenclature of Vegetable Cultivars: Chairman to be appointed.
– Nomenclature and Registration of Fruit Cultivars. Chairman: J. Ingram, National Fruit Trials, Brogdale Farm, Faversham, Kent, ME13 8XZ, England.

*Commission for Horticultural Economics:*
– E.E.C. and the World trade. Chairman: Dr. W. L. Hinton, University of Cambridge, 19 Silverstreet, Cambridge CB3 9EP, United Kingdom.
– *Farm Management.* Chairman: J. H. Dempster, States of Guernsey Horticulture, Advisory Services, Burnt Lane, St. Marton's, Guernsey C.I.

*Commission for Horticultural Engineering*
– Greenhouse design and environment. Chairman: Mr. K. W. Winspear, N.I.A.E., Wrest Park, Silsoe, Bedford, MK45 4HS, U.K.
– Horticultural Machinery. Chairman: Ir. C. J. van der Post, IMAG, P.O. Box 43, 6700 AA Wageningen, The Netherlands.
– Plastics in Horticulture. Chairman: Prof. Dr. Ir. A. Nisen, Fac. des Sciences Agron., 2 Avenue de la Faculté, 5800 Gembloux, Belgium. Joint W. G. with Comm. Protect. Cultivation: Dr. J. A. Damagnez, Station du Bioclimatology, INRA, Domaine St. Paul. 84140 Montfavet, France.

*Commission for Plant Protection*
– Fireblight. Chairman: Ir. G. S. Roosje, Research Institute for Plant Protection, P.O. Box 42, 6700 AA Wageningen, The Netherlands.
– Soil-borne Pathogens. Chairman: Prof. C. van Assche, University of Leuven, Phytopathological Lab., Kard. Mercierlaan 92, B 3030, Heverlee, Belgium.
– Virus Diseases of Ornamental Plants. Chairman: Dr. M. Hollings, Glasshouse Crops Research Inst., Littlehampton, Sussex BN16 3PU, U.K.
– Virus Diseases of Vegetables. Chairman: Dr. G. P. Martelli, Ist. di Patologia Vegetale, Via G. Amendola 165/A, 10126 Bari, Italy.
– Weed Control of Vegetables. Chairman: Dr. G. Maas, Institut für Unkrautforschung BBA, D-33 Braunschweig, Messeweg 11/12, Germany Fed. Rep.
– Resistance breeding in Horticultural Crops. Chairman: Dr. R. Watkins, Fruit Breeding Section, East Malling Research Station, East Malling, Maidstone, Kent ME 19 6BJ U.K.
– Virus Diseases of Fruit Trees. Chairman: to be appointed.
– Virus Diseases of Small Fruits. Chairman: Dr. A. F. Murant, Scottish Horticultural Research Institute, Invergowrie, Dundee DD2 5DA, U.K.
– International Committee for Cooperation in Fruit Tree Virus Research. Chairman:

Prof. A. F. Posnette, East Malling Research Station, East Malling, Maidstone, Kent ME19 6BJ, U.K.

*Commission for Plant Substrates*
– Substrates in horticulture other than soils in situ. Chairman: Ir. A. P. Hidding, Rijkstuinbouwconsulent voor Bodemaangelegenheden, Postbus 55, 6700 AA Wageningen, The Netherlands.
– Standardization of Analytical Methods. Chairman: Dr. G. Hoffmann, Staatliche Landwirtschaftliche Untersuchungs- und Forschungsanstalt Augustenberg, 75 Karlsruhe 41, Postfach 410943, F.R.G.
– Composting of Waste Materials. Chairman: Dr. T. Pudelski, Acad. of Agric., Poznań, Poland.

*Commission for Tropical and Subtropical Horticulture*
– Mango. Chairman: Dr. K. L. Chadha, Central Mango Research Station, B 53, Sector A, Mahanagar, Lucknow, 226006, India.

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