

ABSTRACTS OF PAPERS CONCERNING HORTICULTURE, PLANT PATHOLOGY AND PEST INVESTIGATIONS AT THE ANNUAL MEETING OF THE AGRICULTURAL RESEARCH CENTRE IN 1959

The following presents abstracts of short lectures at the Annual Meeting of the Agricultural Research Centre at Tikkurila on February 26—27, 1959.

Characteristics of some strawberry varieties. By J. E. HÅRDH, Department of Horticulture, Piikkiö. — In a preliminary test, started in May, 1957, the yields of the varieties Senga Sengana, Ydun, Wädenswill III, Wädenswill II and Bliss were respectively 101.1, 96.6, 63.8, 39.0 and 34.4 kg per 100 m². The early yields, harvested during the first two weeks, were correspondingly 34.4, 74.1, 83.7, 79.2 and 63.1 % of the total yields. According to this, Senga Sengana and Ydun are about equal in yield, the former variety being considerably later. Very early varieties in this test were Wädenswill II and III. Of all the varieties tested, the fresh flavour of Wädenswill III was estimated to be the best, according to scale 0—5 it was 4.7, while the flavours of Ydun, Bliss, Senga Sengana and Wädenswill II were 3.8, 3.7, 3.3. and 3.0.

Of these varieties Ydun is well known as a high yielding one, its keeping qualities, however, are poor. Senga Sengana, on the other hand, is known as a variety with good qualities for storing and processing. For this reason the usefulness for deep-freezing of the varieties were tested in 1958. Freezing was performed using the contact method and was started immediately after harvesting, the harvest period lasting from 14th to 30th of July. On January 19, 1959, the berries were defrozen and their flavour, colour and consistency were estimated. Each property is characterized, according to scale 0—5, as follows.

	Senga Sengana	Ydun	Wädenswill III	Wädenswill II	Bliss
Flavour	3.1	3.1	2.6	3.0	1.9
Colour	3.6	3.8	3.8	2.7	2.6
Consistency	3.4	2.3	3.3	1.9	1.5
Total	10.1	9.2	9.7	7.6	5.0

After deep-freezing the flavour and colour of the varieties Senga Sengana, Wädenswill III and of Ydun were the best, the consistency of Ydun being, however, poor. This variety might thus be of small value for freezing purposes. Senga Sengana

is a high yielding, middle late variety with a good consistency and good freezing qualities. The berry is, however, unusually dark in colour, sour, and irregular in shape. For these reasons the Senga Sengana might not be suitable as a dessert berry. Wädenswill III produces relatively high yields, freshly harvested it is good in flavour and colour, and quite good for freezing purposes.

The appearance of tomato blossom-end rot. By J. E. HÅRDH, Department of Horticulture, Piikkiö. — Previously it has been shown by the author that the development of blossom-end rot on tomato is primarily influenced by physiological dryness, due to a higher than normal salt concentration (conductivity) in the soil or to a temporary water shortage. At the time when the development of the blossom-end rot starts, the water content of the fruits has been shown to be normal. As a result of the physiological dryness, the conductivity of plant sap and the malonic acid content of the fruits increase. Due to the fact that irregularities in the irrigation of tomato cultures sometimes happen, an investigation was carried out as to how short a period of physiological dryness is required to promote alterations in the plant sap conductivity and in the incidence of blossom-end rot. Three plants of the variety Immuna in each treatment were planted 10.7. The water uptake of the plants was diminished on 15.8. by raising the soil conductivity up to 6.0, after which the soil was washed using plenty of water, and the conductivity after different intervals thus lowered down to 0.5. The fruits were picked and tested from 13.9. to 1.10. The duration of physiological dryness and the percentages of fruits injured were as follows.

Length of physiological dryness days	Blossom-end rot %	Internal necrosis %	No. of fruits
0	2.8	0	36
1	7.7	15.4	26
2	3.3	13.2	30
3	20.7	30.6	20
4	28.6	28.6	21
7	33.3	0	6
14	42.8	0	7

A halt in the water uptake of three days or more increased the amount of blossom-end rot. Internal necrosis was seen on the fruits of plants that had suffered from physiological dryness one day or longer.

In another test the conductivity and oxydation-reduction potential (Eh) of plant sap was determined on the 1st, 2nd, 3rd, 4th, 7th, 9th, 11th and 14th days after the soil conductivity had been raised from 0.5 to 5.5. The sap conductivity was correspondingly 6.7, 5.4, 4.5, 6.7, 6.1, 7.3, 7.0 and 9.8. Alterations in the oxydation-reduction potential could not yet be detected during the 14 days.

The experiments show that the number of fruits injured by blossom-end rot may rise strikingly because of dryness during 3 days, the fruit sap conductivity, however, being at the time no higher than normal. The appearance of blossom-end rot and of internal necrosis on tomato fruits might therefore be a result of alterations in the enzyme activities stimulated primarily by difficulties in the water uptake. Altera-

tions, on the other hand, in the conductivity of fruit sap or in the water content of fruits, cannot be detected at the stage when the development of blossom-end rot starts.

The use of mercurous chloride in the control of clubroot. By ANNIKKI LINNASALMI, Department of Plant Pathology, Tikkurila. — In the summer of 1958 preliminary trials were carried out on different methods of mercurous chloride applications in the control of club root (*Plasmodiophora brassicae*) in cabbage, variety Ditmarsk. The different methods tested were: mixing the compound C.R.C. - tehostettu (Hg_2Cl_2 4 %, lindane 0.25 %) into the pricking-out soil at rates of 3 g and 5 g per seedling; dipping the roots of the seedlings in a suspension of clay and mercurous chloride; dipping the roots in a suspension of mercurous chloride alone. Using the clay suspension dip, approximately 1.8 g of the preparation remained on the roots, while with the mercurous chloride suspension the amount was 1.4 g per plant. For comparison the standard procedure used with success by this Department for many years was also employed: it consisted of mixing 5 g of the C.R.C. compound into each transplanting hole on the field, a procedure which however, is impractical in extensive cabbage cultivations.

The results of the preliminary trials showed that all the treatments reduced the club root damage in the cabbage. This was shown both by the yield data and by the amount of infection in the cabbage. Clubs appeared only in the lateral roots of the treated plants, the degree of infection (scale 0—3) being relatively slight, 1.2—1.6. In comparison the untreated controls had their lateral roots infected to an extent of 2.2 as well as their primary root with 1.2 degrees of infection.

The best yield was obtained from the plants which had benefited from the transplanting-hole treatment; their average weight of head was 1.67 kg. The plants grown in pricking-out soil which had been treated with mercurous chloride had average head weights of 1.44 and 1.31 kg, the plants dipped of mercurous chloride-clay suspension averaging 1.31 kg. Suspension of mercurous chloride alone was evidently too radical a treatment. Its poisonous effect appeared immediately, and the seedlings remained stunted for many weeks so that their average head weight was only 0.95 kg, that of untreated control being 0.48 kg.

When the cabbage was harvested, damage from cabbage root flies (*Hylemyia* spp.) was also analyzed. The results showed that all the treatments reduced the damage, the pricking-out soil treatment most of all. Injuries to the plants by leaf pests, principally the diamond-back moth (*Plutella maculipennis*) and flea beetles (*Phyllotreta* spp.), were smallest in the plants which had been transplanted in holes treated with the mercurous chloride compound.

On treatment of Cyclamen with gibberellin. By KIRSTI OSARA, Depart. of Horticulture, Piikkiö — In order to find out the influence of gibberellin on the flower formation of Cyclamen an experiment was carried out at Lepaa Horticultural College in 1958. ACP gibberellic-D was used as 25, 50 and 100 ppm. solutions. The experiment consisted of two sections: at the time of starting the treatments the plants of section 1 had flower buds 2 mm. in diameter, in section 2 they were 2—5 mm. — Gibberellin had a marked influence on the growth of the flower stalks, the difference between untreated plants and plants treated with 100 ppm. in section

1 was 5 cm., and in section 2, 9 cm. The flower stalks of untreated plants in section 2 were 16.9 cm., those treated with 25, 50 and 100 ppm. correspondingly 22.7, 23.6 and 26.0 cm. — The longer the stalks the thinner, bending or falling occurred, however, only in a few cases. — The flower buds developed as rapidly on untreated as on treated plants. Differences in the earliness of flowering, thus, did not occur. The number of flowers was probably somewhat higher on the treated plants. — The flowers of the treated plants were not normally developed, the petals although of the usual length were narrow and twisted in spirals. According to this experiment gibberellin applications are not to be recommended for Cyclamens.

On the broccoli varieties. By KIRSTI SALOKANGAS, Department of Horticulture, Piikkiö, — In the last few years broccoli has become a subject of growing interest in Finland. In methods of cultivation and processing it is very similar to cauliflower.

In growing broccoli there are two possible ways in Finland: direct sowing outdoors or planting. With the planting method an earlier yield can be obtained and the total yield may be higher due to a longer harvesting season. The yield and quality are influenced by the density of the crops. The denser the crop the smaller the primary shoots. The hardiness of sprouts, that is the morphology of the tissues, is influenced by the density of the crop, which is important in estimating the flavour.

In the variety tests at the Department of Horticulture seven varieties have been tested: De Cicco, Italian, W:s Calabrese, Improved Calabrese, Green Mountain, Morses Early and Morses medium strain. The earliest variety was De Cicco. Its total yield seems to be lowered by the smallness of the primary sprouts. Italian gives the highest yields but the quality is poor. The plants of this variety sometimes do not develop any primary sprouts and only a certain number of tender secondary sprouts. The latest of these varieties is Morses medium strain. The primary sprouts of this variety are very large and sturdy, the total yield being, however, low due to a short cropping period. In Finland the most suitable varieties giving the highest yields are W:s Calabrese, Green Mountain and Morses Early. Of these Morses Early is somewhat earlier than Green Mountain and W:s Calabrese. In all three varieties the primary sprouts are equal in size, those of W:s Calabrese being somewhat heavier than the sprouts of the others. Secondary sprouts are fewer on W:s Calabrese, the total yield thus being lower.

In flavour tests on deep-frozen broccoli the best varieties were Morses Early, Green Mountain and W:s Calabrese.

Chlorosis of Saintpaulia. By EEVA TAPIO, Department of Plant Pathology, Tikkurila. — In the spring of 1958 has been carried out experiments in order to determine the factors responsible for chlorosis or leaf mottling in Saintpaulia (African violet).

Ninety plants were tested in the experiments. One-half of these were grown from healthy green leaves and one-half from strongly chlorotic leaves. All the leaves formed roots and developed into normal plants, although the chlorotic leaves developed considerably slower than the green ones. At a later stage there was no difference in the growth vigour between the two groups nor did the plants grown from chlorotic leaves show a greater tendency to become chlorotic than the plants from

healthy leaves. It therefore seems reasonable to conclude that no virus or other infective disease was involved.

Tests showed that wetting the leaves with cold water (1°—5° C.) caused chlorosis in the leaves. Wetting the base of the plants did not cause mottling, though the colour of the leaves became lighter.

Sudden changes in temperature were found to have a damaging effect on Saintpaulia. Plants which were given three cold treatments at one-monthly intervals (2.5—10° C. for 2—3 days) developed chlorosis so severely that the spots became brown and the leaves gradually wilted. After the end of the cold treatment the plants were still not normal; new leaves were pale green in colour, the plants grew slowly, and the flowering was late.

Bright sunlight was also a factor causing leaf mottling in these tests. Excessive sunlight can be compared to sudden temperature changes since the temperature is considerably higher when the sun is shining than in the same place at night or in cloudy weather.

Fertilizing tests showed that fertilizers neither increased nor prevented chlorosis of Saintpaulia.

In conclusion it can be stated that chlorosis of Saintpaulia is a non-infective plant disease belonging to the class of physiological disturbances. It can be caused by sudden temperature changes, by bright sunlight, or by wetting the plants, especially their leaves, with cold water. This conception has, according to reports in the literature, become generally accepted among research workers.

On the control of cabbage maggots (Hylemyia brassicae Bouché and H. floralis Fall.) by seed dressing with insecticides. By KATRI TIITTANEN, Department of Pest Investigation, Tikkurila. — In the summer of 1958 field trials were arranged at Tikkurila to control cabbage maggots by seed dressing. Swede, big-leafed turnip, and winter turnip rape were the test plants. For the treatment of seeds varying amounts of 40 % aldrin, 50 % demeton, 50 % dieldrin, 25 % heptachlor, 75 % lindan, and Thimet 44-D were used. Syrup and ethylhydroxyethylcellulose were used as the carriers. In all the test plants good results against the cabbage maggots (of the species occurring in the trials about 97 % were *Hylemyia brassicae* specimens and about 3 % *H. floralis*) were obtained with the following amounts of insecticides: 75 % lindan 160 g, 25 % heptachlor 1 000 g, 40 % aldrin 620 g, and 50 % dieldrin 200 g per one kg of seed. A smaller quantity of the substances had in no trial sufficient effect. Demeton and Thimet 44-D were nearly ineffective. Both of the carriers used were equally good.

Treatment with lindan — — 75 % lindan 160 g to one kg of seed — — gave also, when the plants were at the seedling stage rather good results in the control of flea beetles (*Phyllotreta* spp.) and caterpillars of the diamondback moth (*Plutella maculipennis* Curt.).

Chemical control of the timothy gall midge (Contarinia kanervoi Barnes) (Dipt., Cecidomyiidae). By A. TINNILÄ, Department of Pest Investigation, Tikkurila. — The larvae of the timothy gall midge have in recent years caused considerable losses of yield on timothy seed cultivations in some communities in South and Middle Pohjanmaa (Ostrobothnia). Damage has occurred especially in such areas where

the seed of timothy has been taken from the same or adjacent grasslands. Although the biology of the species is still under research, control experiments were started last summer in Nivala (64 N, 25 E).

The second and third year leys were treated with insecticides about one week after the timothy had come into ear when the occurrence of the timothy gall midge seemed to have reached its peak and the oviposition was going on. Malathion, parathion, and methyldemeton sprays (1.0, 0.25, and 0.5 litre effective substance per hectare) were effective against the adults of the timothy gall midge. Malathion and parathion dusts (10—20 kg dust per one hectare) were somewhat less effective. The treatments decreased considerably the amount of larvae. The increase of seed yield was, when sprays were used, 22—35 %, with the dusts it was 4—23 %. The experiments will be continued in order to find out the best control substance, the most suitable amount and the most favourable time for its application.

SELOSTUS:

PUUTARHA-, KASVITAUTI- JA TUHOELÄINTUTKIMUKSIA KÄSITTELEVIÄ ESITELMIÄ
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Maatalouden tutkimuskeskuksen koetoimintapäivillä Tikkurilassa, helmik. 26.—27. p:nä 1959, pidettiin seuraavat puutarha-, tuhoeläin- ja kasvitautitutkimuksia käsittelevät pienenoiset esitelmät.

Puutarhantutkimuslaitos, Piikkiö: J. E. Härth »Eräiden mansikkalajikkeiden ominaisuuksista»; J. E. Härth »Tomaatin latvamädän esiintymisestä»; Kirsti Osara »Syklaamin gibberelliinikäsittelystä»; Kirsti Salokangas »Parsakaalilajikkeista». — *Kasvitautilaitos*: Annikki Linnasalmi »Elohopeakloriidiin käyttö möhöjuuren torjunnassa»; Eeva Tapio »Paavalinkukan marmoroitumisesta». — *Tuhoeläintutkimuslaitos*: Katri Tiittanen »Kaalikärpäsen toukkien torjunnasta käsittelemällä siemenet insektiideillä»; A. Tinnilä »Timoteisäaskan kemiallisesta torjunnasta».