
**LIETUVOS MOKSLŲ AKADEMIJA**
**Žemės ūkio ir miškų mokslų skyrius**
**LIETUVOS SODININKYSTĖS IR DARŽININKYSTĖS INSTITUTAS**

# Programme for COST 863 WG 1 SGM

## *Small berry variety evaluation*

**Thursday 29th January**
12.30 Welcome and introduction

***13.00 – 16.00 Strawberry variety evaluation***

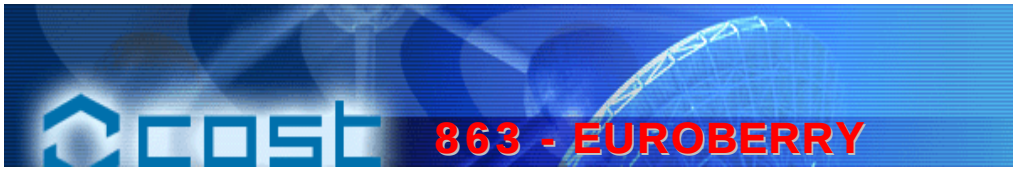
**Rytis Rugienius, Nobertas Uselis** "Breeding and evaluation of strawberry varieties in Lithuania"
**Agniezka Masny** "Evaluation of strawberry varieties in Poland"
**Darinka Koron** "Evaluation of strawberry varieties in Slovenia"
**Sezai Ercisli** "Strawberry variety evaluation in Eastern part of Turkey"
**Philippe Cartier** "The organization of the test of introduced strawberry varieties in France"
**Carmen Soria** **"**Evaluation of strawberry varieties in Spain: 2008 RAEA assay".
**André Ançay** "Evaluation of strawberry varieties in Switzerland".
**Gianluca Baruzzi** "The Italian Strawberry National Variety Network: the results of last two years of evaluations"

**Discussion.** Actualities of strawberry variety network in North, Middle and South Europe. Common descriptors.

16.00 -16.30 - *Coffee break*

***16.30- 18.30 Raspberry variety evaluation***
**Sarmite Strautina** "Evaluation of raspberry varieties in Latvia"
**F. Dénes Fertőd** "Primocane raspberry breeding in Hungary"
**Paulina Mladin** "Evaluation of small berry varieties in Romania"
**Hedi Kaldmäe** "Small berry varieties evaluation in Estonia".
**Sezai Ercisli** "Raspberry cultivar evaluation in Turkey"

**Discussion.** Actualities of raspberry variety network. Common descriptors.

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# Programme for COST 863 WG 1 SGM

## *Small berry variety evaluation*

**Friday 30th January**
***8.30- 10.30 Blackcurrant and highbush blueberry variety evaluation***
**Audrius Sasnauskas, Tadeusas Siksnianas** "Breeding and evaluation of blackcurrant varieties in Lithuania"
**Sarmite Strautina** "Evaluation of blackcurrant varieties and selections in Latvia"
**Saila Karhu** "Evaluation of blackcurrant varieties in Finland"
**F. Dénes Fertőd** "Blackcurrant trial results in Hungary"
**Darinka Koron** "Evaluation of highbush blueberry varieties in Slovenia"

**Discussion.** Blackcurrant and highbush blueberry variety networks – problems and perspectives. Common descriptors.

10.30-11.00 *Coffee break*

***11.00-12.00 The variety network as expected by the nurseries***
**Danilo Bernardini** "The variety network as expected by the nursery organization in the Southern area".
**Philip Lieten** "The variety network as expected by the nursery organization in the Northern area".

12.00 - 13.00 ***General discussion***
Discussion about actualities of small berry varieties network: Plan of activities and publication. What outputs can be expected from this network.

14.00-19.00 Excursion to Lithuanian Institute of Horticulture (Babtai)

COST 863 Euroberry

"SMALL BERRY VARIETY EVALUATION"

Vilnius – 28th to 30th of January 2009

WG Number 1 (see the Action Organization Programme)

*Presentation Number(leave free)*

**TITLE**
(TNR, 12 cpi, bold, uppercase, no justify)

# BREEDING AND EVALUATION OF STRAWBERRY VARIETIES IN LITHUANIA

**AUTHOR/S**
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**KEYWORDS**
(TNR, 10 cpi, italic, max 5

Strawberry, variety, breeding, evaluation, network

**TEXT**
(TNR, 10 cpi, justify)

Strawberry breeding in Lithuanian Institute of Horticulture (LIH) continues from 1956. Main strawberry cultivars, bred in LIH - 'Nida', 'Venta', 'Jaune', 'Saulene' and 'Dange' are winterhardy, productive with very good taste and aroma berries. They were popular in Lithuania, cultivar 'Venta' – even in neighboring countries. Aim of strawberry bredding program in LIH - to develop winterhardy, disease resistant and productive cultivars with high quality, firm and attractive berries. Foreign cultivars: 'Honeoye', 'Dukat', 'Polka', 'Induka', 'Senga Sengana', 'Kama', 'Pandora', 'Marmolada', 'Elkat, 'Elsanta' are popular between Lithuanian growers also. According results of variety trials in LIH strawberry cultivars can be included to the National list of Plant Varieties of Lithuania. Ten strawberry cultivars and hybrid clones were investigated in 2003-2006. Strawberries were planted in two stages – at 2003 and 2004. Under middle Lithuanian agroclimatic conditions cultivars 'Salut' ir 'Roxana' were most winterhardy. 'Irma' and 'Alba' were most cold susceptible ones. Highest two-year (2004-2005) average yield of first planting was received from 'Roxana'(19,6 t/ha) and 'Record' (18,5t/ha), highest yield of another planting (2005-2006) – 'Roxana' (16,5 t/ha) and 'Salut' (13,8t/ha). 'Roxana', 'Record' and 'Qeen Eliza' had the biggest berries. The best appearance was of 'Roxana' and 'Record' berry firmness – of 'Record', 'Alba' and 'Dora', best taste of 'Irma.' Among investigated cultivars the most promising in Lithuanian conditions were 'Roxana', 'Salut' and 'Record'. In the other variety trial (2006-2007), where plants were planted in low beds, mulched by white plastic, 'Elkat', 'Vikat' and 'Salut' were most high yielding among eight evaluated cultivars. In the variety trial, where plants were covered by agromaterial in winter 2007-2008, highest yields showed cultivar 'Elkat' (more than 34 t/ha). Cultivars 'Sonata', 'Darselect' and 'Elsanta' also gives high yield (21-26 t/ha) of good quality berries. Biggest berries at the beginning of season had cultivars 'Figaro' and 'Sonata' (25-26g.).

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COST 863 Euroberry

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# EVALUATION OF STRAWBERRY VARIETIES IN POLAND

**AUTHOR/S** (TNR,10 cpi, uppercase)

AGNIESZKA MASNY AND EDWARD ŻURAWICZ

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**KEYWORDS** (TNR, 10 cpi, italic, max

*Strawberry, varieties*

**TEXT** (TNR, 10 cpi, justify)

Strawberry production in Poland is relative stable. An average annual fruit production is in the range from 180 to 200 thousand tons. The most popular cultivar remains still 'Senga Sengana', with about 60% of the total strawberry fruit production. However, in the last ten years it is observed a continuous increase of cultivation of typical dessert cultivars, mostly of foreign origin. Unfortunately such cultivars are not well adapted to the Polish climatic conditions. Their plants are often damaged by winter frosts and are also susceptible to leaf and root diseases. For that reason there is a necessity of conducting an evaluation of new foreign cultivars before planting them on a large scale (comparative trials). The evaluation of the new foreign cultivars comprises such characters (traits) as: plant resistance to winter frosts and bud and flower tolerance to spring frosts, productivity and fruit quality (yield, fruit appearance - size, shape, skin colour and glossiness, taste, fruit firmness measured with the penetrometer INSTRON 5542, extract measured with the refractometer Rudolph J-157 and ascorbic acid determined by using the reflectometer RQ-Easy and fruit resistance to grey mould (Botrytis cinerea) as well as resistance to leaf diseases: Mycosphaerella fragariae, Diplocarpon earliana, Sphaerotheca macularis and Verticillium wilt.
Additionally, suitability of new cultivars for the special technologies of cultivation, such as protected cultivation (greenhouses, plastic tunnels and flat covers) and open field cultivation (such as late planting of frigo plants, late ripening or everbearing cultivars) for obtaining early and late ripening fruits is tested. Selected cultivars are also tested under integrated and organic growing methods.
The phenotypic evaluation of genotypes maintained in the field collection is simultaneously done, by using one of the fourth strawberry descriptors recommended in European Union. These descriptors are precisely defined by the UPOV, COST 836, GENBERRY or DUS (the short version of UPOV). The UPOV descriptors are usually used for confirming the identity of genotypes maintained in the Polish National Strawberry Gene Bank, funded by the Ministry of Agriculture and Rural Development. The DUS descriptors are used in the pre-registration experiments to confirm distinctness, uniformity and stability of the tested cultivars before including them into the Polish registration list and eventually awarding the breeder rights. The other descriptors have been used to characterize the genotypes involved in COST or GENBERRY projects.

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# EVALUATION OF STRAWBERRY VARIETIES IN SLOVENIA

DARINKA KORON, BOŠTJAN SAJE, ROMAN MAVEC

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Keywords: *production, plant data, fruit data, variety list*

In Slovenia, we had 110 ha of strawberry fields in 2008 with the total production of about 2000 t. Introduction of small fruit varieties in small countries with small-scale production is different from the introduction in countries with large-scale production. Introduction of new varieties is supported by Ministry of Agriculture, Forestry and Food in the project Special Evaluation of Fruit Varieties. Due to a relatively low financial support, the criterion for introduction was simplification. We selected only the criteria important for producers. Vigour and homogeneity, time of beginning of flowering, time of beginning of ripening and tolerance to pests and diseases represent plant data. At 3rd picking we describe shape, homogeneity, colour, brightness and gustative quality (taste and flesh firmness). We measure the quantity and quality of yield in all pickings. Since soil disinfection is not permitted in Slovenia, we laid emphasis on varieties resistant to diseases. All strawberry varieties have been tested in the experimental fields of Agricultural Institute of Slovenia at Brdo pri Lukovici in the last years. Each variety is also evaluated at producers on one to three locations. We planted all the varieties using standard technology in the soil beds with black foil in high plastic tunnel, one to two-year production. Every year we have between 4 and 8 varieties in introduction, depending on new varieties on the market. All the results are introduced in an annual publication and every four years in the book Slovenian Fruit Cultivar List. Since a 4-year publication for strawberries is too rare, all the novelties are also presented every year at the Strawberry Conference which is visited by almost all the producers. The plant growing conditions are very similar to the conditions in our neighbour countries, so we are looking at their experiences. There are no Slovene strawberry varieties but only foreign varieties in the strawberry production. In the past there were Dutch varieties, but today we plant more than 90% of Italian varieties. In the Slovenian Fruit Cultivar List, varieties are divided in the List A with varieties suitable for planting on the whole territory of Slovenia, into the List B with varieties suitable for special technologies or locations, and in day-neutral varieties. In the last Cultivar List from 2006, Miss, Queen Elisa, Elsanta and Civka (Raurica) were classified in the List A. In the List B, Clery, Civmad (Madeleine), Maya, Darselect, Eros, Onda, Onebor (Marmolada), Syphony, Hobthurmardu (Thuchampion) and Idea were classified. From day-neutral varieties there were Diamante, Irma and Selva.

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COST 863 Euroberry

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## STRAWBERRY VARİETY EVALUATİON İN EASTERN PART OF TURKEY

SEZAİ ERCİSLİ AND YASAR ERTURK

Ataturk University Agricultural Faculty Department of Horticulture 25240 Erzurum-Turkey

Day-neutral, strawberry, varieties

In Turkey, the commercial strawberry cultivation just started in 1970s year. Before that date, there were local cultivars such as Ottoman, Arnavutkoy and Eregli used in family business plantations. After 1980 year, new high yielded varieties were introduced to country and at the same time commercial production increased. During 1980 to 2000 year strawberry production in Turkey increased very sharply. Currently, strawberry production is mainly done in Mediterranean areas. However this region has very narrow range of harvesting period. For that reason strawberry production has also done by the other agroclimatic areas. Eastern Anatolia region has high altitude therefore strawberries are start to maturate at the and of June and continue to October. The day neutral cultivar Fern has been dominating strawberry production in this area. A lot of variety evaluation has been done in this region compared to Fern and results showed that Fern is over the other cultivars.

In this study we compared cv. Fern with the other day-neutral cultivars such as Whitney, Kabarla and Gianna. The results showed that the highest yield as g per plant were obtained from cv. Fern as 570 g and followed by cv. Whitney (447 g), cv. Kabarla (303 g) and cv. Gianna (226 g). There were statistically differences among cultivars in terms of yield per plant. The average fruit weight was the highest in cv. Whitney (9.71 g) while the lowest in cv. Fern (7.4 g). cv. Whitney had the highest SSC content. There were statistical differences among cultivars in terms of Vitamin C (48.4-52.4 mg per 100 ml fruit juice). The results indicated that cv. Whitney can be an alternative to cv. Fern in this region.

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# THE ORGANIZATION OF THE TEST OF INTRODUCED STRAWBERRY VARIETIES IN FRANCE

PHILIPPE CHARTIER

Ciref Création Variétale Fraises – Fruits Rouges

*Strawberry, varieties, introduction, evaluation, network*

Strawberry growers need to know which one among the new varieties from the world can be of interest for their activities in their growing conditions. They request an evaluation of the agronomic and commercial value of germplasms which are normally grown in environments often different from theirs. In France, this evaluation is based on a network whose management is in the hand of professional organizations.

The aim of this presentation is to give an update on the more recent changes in the way this network is organized, its locations, protocols, statistics and results from the last years.

The evaluation of new germplasms is split between the test of commercial varieties and of selections including Ciref and other organizations. New varieties are studied on a 2 steps process with a first year on the 2 main locations of Douville (24) at HORTIS Aquitaine and of Balandran (30) at CTIFL. That is the "A" stage. The best adapted ones are then evaluated in the network of the 6 regional stations in addition to the 2 former ones. That is the "B" satge. Advanced selections are evaluated on Douville at Ciref using a lighter design for a first adaptation evaluation.

14 to 21 varieties have been studied over the last 4 years for junebearers and 6 to 8 for everbearers. For junebearers, about half of them move to the B stage. Remaining ones make an additional A stage or are dropped.

The FRANET web site available on http://www.fruits-et-legumes.net is presented as it shows the complete datas for the tested varieties.

The references of the organizations in charge of setting up the trials for commercial entries are given, such as Jean Philippe Bosc from CTIFL at ***Bosc@ctifl.fr*** or Christian Gauthier from HORTIS Aquitaine at ***christian.gauthier@hortis.fr***

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# EVALUATION OF STRAWBERRY VARIETIES IN SPAIN: 2008 RAEA ASSAY

MEDINA, J.J., LÓPEZ-ARANDA, J.M., MIRANDA, L., SÁNCHEZ-SEVILLA, J.F., ARIZA, M.T., P. DOMÍNGUEZ, AND SORIA, C.

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Strawberry, varieties, evaluation, network

The activities of IFAPA (Andalusian Institute for Agrarian and Fisheries Research and Education Sciences) include technology transfer processes. The Andalusian Network of Agrarian Experiments (RAEA) is one of the main instruments for these technology transfer processes. The RAEA network is a good example of an "on farm research" and it is very known by most of the leading sectors in the agrarian sector in Andalusia. Five basic programs constitute RAEA: herbaceous crops (cereals, sunflower, cotton, etc.), ecological agriculture, cattle, horticultural crops (vegetables under greenhouse and open-air, potatoes, asparagus, strawberry and cut-flowers and tree crops (olives, citrus, wine). In the case of strawberry (RAEA-Strawberry), the specific program started in 1986-87 season. Each 3-4 year period, RAEA-Strawberry focuses a particular experimental activity. Due to the important fact of strawberry variety adaptation, from 1997 to 2006, RAEA-Strawberry has been working on new well-adapted varieties to the coastal area of Huelva. Under a single common protocol of work more than 60 varieties have been tested. Since 2007 RAEA-Strawberry is focused on the study of the adaptation of known varieties to different cultural techniques. During the last 2008 season, the performance of eight varieties ('Aguedilla', 'Albion', 'Camarosa', 'Candonga©', 'Coral', 'Festival', 'Palomar' and 'Ventana') cultivated in standard (three trial locations), soil-less (one trial location), and organic (one trial location) production system, and employing two planting dates (early and conventional) was analysed. Parameters related with production, sensorial quality, and post-harvest quality have been studied.

Among the parameters studied, results obtained pointed out that external and internal color, fruit firmness, soluble solid content, weight fruit and misshapen fruits are not affected by the planting date but the cultural technique employed and the variety. Plant survival was not affected by the planting date but in soil-less system where it was lower when an early planting date was employed. Early and total production were higher in conventional crop systems followed by soil-less and organic crop systems. Effect of the planting date onto the percentage of second class fruit and yield were observed in some cases. Results will be discussed.

RAEA-Strawberry information is available in IFAPA web page (http://web-ifapa.cice.junta-andalucia.es:6080/innovacioncienciayempresa/ifapa/servlet/FrontController).

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"SMALL BERRY VARIETY EVALUATION"

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## EVALUATION OF STRAWBERRY CULTIVAR IN SWITZERLAND

ANDRE ANCAY

Agroscope Changins-Wädenswil ACW, Research Center of Conthey, CH-1964 Conthey

*Strawberry, cultivar, evaluation, yield, quality*

In Switzerland, a two steps cultivar evaluation is running since the season 2007. The evaluation is managed by Agroscope-Changins Wädenswil Research Station ACW in association with consultants of the different regions and the Swiss Berry Association (FUS).
First, 10 to 15 new cultivars proposed by European breeders are cultivated by Agroscope ACW in 3 conditions representing the main Swiss conditions of strawberry production: lower regions (450 m) with and without plastic tunnel and in mountain region (1100 m) without tunnel. The varieties are characterized according to the following measurements:

- Agronomic behavior of plants (vigor, homogeneity, sensitivity to diseases and pests, resistance to frost).
- Yield
- Quality (Fruit weight, Brix, Acidity, Firmness, Taste by consumer tests)
- Maintenance of fruit quality in post-harvest

In a second step, consultants, members of the Swiss Berry Association and scientists select 5 to 6 varieties presenting the highest interest for the Swiss production. These varieties will be cultivated then in an enlarged network comprising the 5 main production regions of Switzerland. Usually, these varieties are cultivated by producers and managed by a regional consultant. The cultivars are evaluated in comparing their yield, fruit quality and picking behavior. These observations of the selected varieties are compared with the reference variety of the producer.
This two step strategy of evaluation of new cultivar allows acquiring useful information for scientists, consultants and producers in a very short time.

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## ITALIAN STRAWBERRY VARIETAL EVALUATION NETWORK

GIANLUCA BARUZZI AND WALTHER FAEDI

CRA-Unità di Ricerca per la Frutticoltura, Forlì (ITALY)

Strawberry, evaluation, variety, network

In Italy, 250 strawberry varieties (*Fragaria x ananassa*), coming from 17 different countries have been evaluated from 1993 to 2008 in the frame of the National Project "Liste di orientamento varietale dei fruttiferi", financially supported by the Italian Ministry of Agriculture and Forestry (Mipaaf) and by some Italian Regions. In 2008, 12 Italian research institutions have been involved in the Project "Liste di orientamento varietale dei fruttiferi", carrying out their activities on 18 experimental fields distributed in 11 Regions. The CRA Fruit Culture Research Unit of Forlì, coordinates the Project and ensures the multiplication of the new varieties, which are annually propageted in an experimental nursery and distributed to all the Partner Units. In each region, the experimental fields are managed by adopting local cultural techniques.

Currently, the most widespread cultivation systems are summer planting (with cold stored plants) in the Northern areas and winter planting (with fresh bare root plants or plug plants) in the South. In the north, the planting date is different in each location: first week of July in the Cuneo area (Mountain area); end of July in Cesena area and Verona (Po Valley); end of August in Verona (Po Valley); first week of September in Metaponto (South); mid September in Sicily (South). In the South the planting time ranged from the end of September to first November. In the North, these varieties have been evaluated in open field, under tunnels and, in the Verona area only, in "fall culture". On the other hand, in the South these varieties have been evaluated only under tunnels.

The day-neutral varieties have been grown following the technique used for the June-bearing, except for the Cuneo area where they have been planted in Spring under tunnels protected with plastic film during the picking period (from June to October). Each variety description is based on data and observations annually collected. Usually, each variety is evaluated for two years by each Unit in a single plot of 10-14 plants. Then, only the most interesting varieties for each specific area are promoted and undergo further studies. Otherwise, varieties that have been evaluated not suitable for an area, are discarded.

As a result of its activity, the Project yearly issues a list of the "Positive" varieties adapted for each different areas and kind of cultural techniques. It is published for strawberry growers, technicians and nurserymen. For each evaluated variety, the data on vegetative growth, production and susceptibility to major diseases, are reported in a web site http://www.informatoreagrario.it/rdLia/08ia17_3394_web.

All the Institutions involved in this Project annually draw up a pomological descriptor list divided into 5 sections: plant, leaf, flower, fruit and post harvest. During the vegetative period, the susceptibility to diseases is detected. After winter, the branch crowns per plant are recorded. Then, the dates of beginning of the blooming (two open flowers for each plant), full blooming ( 50% of open flowers) and end of blooming, are recorded. For the bi-flowering varieties, with a second blooming 20 days after the first one, the intensity of blooming is estimated. For the day-neutral varieties, the intensity of reblooming capacity is also estimated. During the picking period, the following data are recorded: commercial yield, discarded fruits (Ø<22 mm, malformed and rooted) and weight of 20 marketable berries. These data are used to determine total yield (commercial yield + discarded), average berry weight, earliness index (in days, from January 1st (Julian days).

In the description table, the most important vegetative and productive characteristics of the plants and the quality traits of the fruits collected in the area of cultivation are reported.

Each variety description includes also some productive and qualitative data in comparison with the check variety of the site.

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COST 863 Euroberry

"SMALL BERRY VARIETY EVALUATION"

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WG Number 1 (see the Action Organization Programme)

*Presentation Number(leave free)*

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# INVESTIGATION OF RASPBERRY CULTIVARS AND HYBRIDS IN LATVIA

SARMITE STRAUTINA, KASPARS KAMPUSS, INTA KRASNOVA

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*Cultivars, fruit quality, raspberry, Rubus, winterhardiness, yield*

Raspberry in Latvia is the third most important berry crop after strawberry and black currant. The area of raspberry in 2006 was 250 ha. On the other hand, the average yield of raspberry is only 3 t per ha. There are several reasons of low yield: adverse conditions of wintering, poor adaptation and low productivity of cultivars, bad agrotechnical conditions. To improve the assortment of raspberry cultivars, we investigated 9 cultivars and hybrids from several sources during the years 2003-2007. Yield, average weight of 100 berries and biochemical content of berries were investigated. Big difference of climatic conditions was observed between the years of the investigations. Cultivar 'Lina' had the highest yield per bush - 1.2 kg. The highest average weight of 100 berries had cultivars 'Ina' – 386 g and 'Tulameen' - 352 g. Cultivar 'Lina' had the highest content of total phenolics 245 mg/100g. The cultivars 'Tulameen', 'Meeker', and 'Schőnemann' were the least winterhardy and had low yields.

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# PRIMOCANE FRUITING RASPBERRY BREEDING AT FERTŐD

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*Keywords: breeding, primocane, raspberry*

Raspberry breeding was commenced in Hungary in the second half of the fifties, previously to which there were no major plantations and the fruit was picked from wild plants. The first plantations were established using foreign varieties. The breeding priorities were higher yields and larger fruit. Up till 2000, breeding concentrated mainly on red-fruited, floricane varieties with a two-year production cycle. The breeding aims have expanded to include resistance to pathogens, suitability for processing (dark red colour for juice production, firm flesh for freezing using the IQF technology) and long shelf-life.

There were fundamental changes in the raspberry market after 2000. Juice production was discontinued and considerably less fruit was frozen, so growers had to concentrate on the fresh market, which meant adapting to new criteria. If markets are to be conquered and retained, fruit must be available over a long period, requiring forcing to produce early-maturing fruit and the cultivation of primocane varieties to prolong the harvesting season.

Canes of primocane varieties flower at the end of growth in the first year, with flowers and fruit developing in basipetal order. Foreign varieties left much to be desired in terms of ecological suitability and fruit quality, so a crossing programme was initiated involving primocane varieties. Hybrid material was developed from the 'Autumn Bliss' × 'Fertődi aranyfürt' cross and from open-pollinated seedlings of 'Golden Bliss' and 'Zeva Herbsternte'.

The selection criteria were early maturity, fruit colour, size, shape and firmness, and the length of the picking period. The basis of comparison was 'Autumn Bliss' for red varieties and 'Golden Bliss' for yellow varieties. Population analysis was based on the starting date of flowering and fruit ripening, the number of harvests, the mean weight of the fruit, the fertility of the canes, the length of the canes and the ratio of buds that open.

Hybrids 4/5 and 6/1 were outstanding for their fertility and 4/1 for its earliness. As regards the mean weight over the whole harvesting season, 4/1, 4/5 and the yellow hybrid 6/26 gave the best results, while 4/1, 4/5 and 6/1 were the best in terms of the percentage of fruit-yielding buds (with values of over 50%).

The virus testing and multiplication of the best mother plants is now in progress.

The large, conical, red fruit of 4/1 have an average weight of 4.5 g, with medium consistency but a good raspberry taste. The early start of ripening is combined with a relatively short cane height. Some 50% of the buds open and produce fruit.

The red fruit of 6/1 are truncated cone-shaped, with hard consistency. The fruit are medium in size (averaging 3.3 g), but are tolerant of transportation and have a good shelf life. The yield was 50% greater than that of the comparative variety.

The yellow hybrid 6/26 has a ripening period a month longer than that of 'Golden Bliss'. It produces a similar yield, but the average fruit weight (4.3 g) is more favourable. The fruit have good consistency. When grown under polythene or glass, picking can be continued until December.

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# EVALUATION OF SMALL BERRY VARIETIES IN ROMANIA

**AUTHOR/S** (TNR,10 cpi, uppercase)

PAULINA MLADIN, IRINA ANCU, GHEORGHE MLADIN

**INSTITUTION/S** (TNR, 10 cpi, normal)

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**KEYWORDS** (TNR, 10 cpi, italic, max 5)

*Variety, physical-biochemical properties, yield*

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The main objective of the evaluation in variety trial is that to indentify the most valuable varieties for commercial plantings. For this, the varieties had to have high agronomic characteristics requested both by growers and consumers, such as : high productivity, high berry quality ( size and weight, taste, appearance, color, shape, uniformity of color, shelf life, high biochemical content}, resistance to pests and pathogenes, good adaptability to the ecological conditions, suitability to hand or mechanical harvesting. Since 2005 , at Pitesti-Maracineni, two varieties trials were established : one for blueberry and the other for black currant. In the first, there are under study 16 highbush blueberry varieties compairing with Blueray and Herma 1 controls and in the second , 12 black currant varieties versus Tsema variety control.The varieties are both older and newer ones and of different origine. The ecological conditions are those specific of the temperat continental climate.The locality is situated in the South part of the country , in the hilly areas of Subcarpathiens .Soil type is aluvial with 20 % clay content, low organic matter, pH=5.8.

The planting distances are 3.0 m / 1.0 m. The experimental design is organized by randomized blocks, with 4 replications and 4 plants on the replication plot. The soil maintaining along the rows in blueberry is sawdust mulching and clean cultivation between the rows and clean cultivation in black currant.In the first two years of fruiting ( 2007 and 2008) there were evaluated the following characteristics : flowering and ripening time, bush vigour, berry size, weight and firmness, strigs weight and length, berry number on strigs, blueberries pedicel scar size, berry soluble solids , acidity and pH, resistance to foliar diseases of the black currant varieties( by scoring method 1-9, 1=undameged, 9=very strong damaged).The results are preliminary ones.Varieties Bonifacy, Patriot, Spartan and Delicia produced the largest fruit (1.9-2.2 g) while Herma I and Ozarkblue the smolest ones.The firmnest berries were produced by Delicia, Simultan, Sunrise and Brigitta Blue ( 274-346 gf/ $cm^2$ ).Simultan, Ozarkblue,Darrow and Sunrise were characterised by small and dry pedicel scar. The most productive varieties were as follows : Lax, Herma I, Azur, Darrow, Spartan ( 5000 kg/ha-3566 Kg/ha cumulative yield). The larger fruit was registered in Bona, Ceres, Deea, Tines and Tisel black currant var. and the firmnest ones in Tines, Ceres,Tiben ( 289-119 gf/$cm^2$).The richiest in soluble solids resulted Tisel,Ben Gairn,Titania and 124/3 selection(22.36-19.10 %Brix). Ruben, Ben Gairn,Deea, Tiben, Titania and Ben Hope shown resistance to the foliar diseses : mildew, rust and antracnose.

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# SMALL BERRY VARIETIES EVALUATION IN ESTONIA

H.KALDMÄE[1], A. LIBEK[1], L. ARUS[1], A. KIKAS[1] , M. STARAST[2]

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*variety testing, genetic resources, strawberry, raspberry, high-bush blueberry*

According to the data of Statistics Estonia, in 2007 total area of small fruit was 3325 ha including 648 ha of strawberry, 210 ha raspberry, 614 ha blackcurrant and 100 ha blueberry plantations. Small berry variety testing in Estonia is carried out by the research groups at the Estonian University of Life sciences in two locations: Polli Horticultural Research Centre and Rõhu Experimental Garden; both located in South Estonia. Main focus in variety evaluation is on finding cultivars suitable for the local climatic conditions, special attention is paid on winter hardiness and resistance to spring frosts as the limiting factors for small berry growing in the region.

Evaluations at Polli are carried out on the accessions of gene bank collections including nearly 300 cultivars from seven fruit species and on special trial plots. Currently there are ongoing trials with strawberry and raspberry. Strawberry cultivars evaluation plot was established in 2007 with 16 cultivars (`Emily´, ´Florence´, Sophie´, ´Mae´, ´Rosie´, ´Sophie´, ´Chambly', ´Harmonie´, ´Joliette´, ´Orleans´, ´Elkat´, ´Filon´, ´Filut´, ´Salut´, ´Selvik´, ´Sonata´ and Senga Sengana as control. Winter hardiness, phenology, damage of blossoms by spring frosts and blossom weevil (*Anthonomus rubi*), yield and quality of fruits is investigated. In 2008, the first berries were collected and the highest yield (727g per plant) was obtained from the late ripening cultivar ´Florence´ that did not suffer from spring frosts and developed the largest fruit. The trial will be continued for two more years and this will reveal if it will survive the winter conditions as well.

Our raspberry trial was established in 2005 with 22 cultivars (Aita´, ´Helkal´, ´Tomo´, 'Algonquine', ´Muskoka´, 'Ottawa', 'Herbert', 'Haida', ´Balder´, 'Veten', ´Nova´, ´Reveille´, ´Jatsi´, ´Jenkka´, ´Maurin Makea´, 'Nagrada', and ´Gatineau´) bred in the northern countries. In 2008, the yield was moderate (40-160g per cane); the highest yield was collected from cv. ´Aita´ originating from our breeding program.

Blueberry as a cultivated crop is relatively new Estonia and mostly *V. angustifolium* is used. *Vaccinium corymbosum* has been considered not enough winter hardy. In 2003, the first trial plot with with 17 high-bush blueberry cultivars (´Ama`, ´Blue Rose´, ´Bluecrop´, ´Bluegold´, ´Bluejay´, ´Bruni´, ´Caroline Blue´, ´Chandler´, ´Denise Blue´, ´Hardyblue´, ´Northland´, ´Nui´, ´Olympia´, ´ Puru´, ´Putte´, ´Reka´, ´Toro´) was established on mineral soil at Rõhu Experimental Garden. Measurements of vegetative growth, winter damage and yield have been recorded. The latest results show that although the bushes get considerable damage due to winter conditions, the yield is higher than that of the control variety `Northblue´. In 2007, the highest yield (924 g/ plant) was collected from cv. ´Denise Blue´.

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## RASPBERRY VARİETY EVALUATİON İN TURKEY

Sezai Ercisli

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Red raspberry, variety evaluation

Turkey has very old traditional raspberry cultivation using wild plants. In 1990 year eleven raspberry cultivars such as Heritage, Meeker, Summit, Canby, Newburg, Tulameen, Willamette, Cola, Rubin has been introduced to Turkey and variety evaluation studies in 6 different areas has been done. This first experimentals showed that the same variety showed different behaviours in terms of yield per cane, berry weight, and chemical contents (vitamin C, acidity, pH). For example in Tokat region the highest yield was obtained from cv. Cola, in Samsn region from cv. Meeker, in Ankara region from cv. Canby and in Erzurum from cv. Hollanda Boduru. The highest average berry weight was obtained from Tulameen as 3.02 g and 4.44 g from Tokat and Samsun regions, from cv. Willamette as 2.99 g in Ankara region and from cv. Hollanda Boduru as 3.63 g in Erzurum region. The highest SSC content was observed in cv. Meeker (13.66% in Tokat region and 12.60% in Samsun region), 14.35% in cv. Willamette from Ankara region and 14.23% in cv. Heritage from Erzurum region.

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## BREEDING AND EVALUATION OF BLACKCURRANT VARIETIES IN LITHUANIA

AUDRIUS SASNAUSKAS, TADEUŠAS ŠIKŠNIANAS

Lithuanian Institute of Horticulture, LT-54333, Babtai, Kaunas district, Lithuania

*Black currant, varieties, breeding, biochemical composition*

Blackcurrant is now the largest berry crop grown in Lithuania. Due to government support for planting and developing the processing industry, production and area of blackcurrants increased 5-8 years ago. For very low prices of couple's years this process stabilized and decreasing. The breeding program for blackcurrants is being focused on resistance to the main pests and diseases, quality of berries, adaptation to the local climatic and soil conditions, suitability for mechanical harvesting. High priority is also given to high levels of ascorbic acid, together with low acidity and improved sensory characteristics. Crosses of blackcurrants with *Eucoreosma* section wild currants species allows development of plants resistant to fungal diseases (*R. nigrum* x *R. americanum*, *R. nigrum* x *R. pauciflorum, R. nigrum* x *R. janczewski* in F1-F2 generation). Crosses of blackcurrants with *R. sanguineum (Calobotria)* allows development of plants by a larger number of berries per cluster, less seeds in berries, resistant to fungal diseases in F1-F2 generation.
'Joniniai' (LT), 'Almiai' (LT), 'Pilenai' (LT), 'Vyciai' (LT), 'Gagatai'(LT), 'Ben Alder' (UK), 'Ben Lomond' (UK), 'Ben Tirran' (UK) and 'Zagadka' (RUS) were evaluated in the Lithuanian Institute of Horticulture. According presented data highest bushes had 'Ben Lomond', while lowest – 'Gagatai' and 'Almiai'. Wight's bushes distinguished 'Kriviai' and 'Pilėnai', narrows - 'Ben Alder' and 'Ben Tirran'. More young shoots had 'Ben Lomond' and 'Ben Tirran', more branchs - 'Ben Tirran'. The highest yield observed of 'Ben Tirran'. The largest berries distinguished 'Joniniai' and'Vyčiai'. More resistant variety to fungal diseases - 'Pilėnai'. The highest percent of soluble solids, dry matter and titratable acidity had 'Ben Tirran', ascorbic acid – 'Joniniai', anthocyanins - 'Ben Tirran', skin firmness - 'Joniniai'.

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## EVALUATION OF BLACK CURRANT CULTIVARS AND SELECTIONS IN LATVIA

SARMITE STRAUTINA

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*Black currant, cultivars, winterhardiness, black currant gall mite, reversion*

Black currant is one of the most important berry crop in Latvia. The area of black currant is approximately 700 ha, but the average yield 4 t/ha. The reasons of the low yield are low agrotechnical level, as well as the possibility of cultivars to adapt to changeable climatic condition. For a long time the sortiment of commercial growing cultivars is remaining without any essential changes. The biggest part of commercial cultivars are bred in East Europe (Russia, Belorussia) Zagadka', 'Katiusha', ' Pamiati Vavilova', ' Belorusskaya Sladkaya' and Scandinavia. : ' Titania', ' Ojebyn' as well as two Scottish cvs. 'Ben Lomond' and ' Ben Newis'. The main problems for black currant cvs. are winterhardiness and especially possibility to adapt to temperature fluctuations in the late winter, hardiness to spring frost , resistance to diseases and pests (especially black currant gall mite and reversion).

.The trial was established in April 2004. In trial were included several cultivars and hybrids from common breeding program of Sweden, Lithuania, Latvia and Russia.

During the evaluation the plant damages were registered in winter 2006/2007, when after long thaw period in the last decade of February the temperature fall down to – $28^0$ C. In this situation mostly damaged were the cultivars with short dormancy period, especially cvs. 'Jadrenaya'. The hot weather period in summer and warm winters promoted to multiply such diseases as reversion and powdery mildew and pests: black currant gall mite and red spider mite.

From evaluated selections and cvs. were selected 'Svita Kijevskaja', 'Vologda', BRi 9502-1A, BRi 9508-3A, BRi 9508-3B as best adapted to climatic condition, high productivity and berry quality.

A serious problem in the last years is a spreading of black currant gall mite and reversion. High susceptible to this pest and reversion were cvs. ' Polar' and ' Storklas'.

Mostly of cultivars included in trial had low level of ascorbic acid. This problem is connected with the origin of these cvs. and forms.

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# EVALUATION OF BLACKCURRANT VARIETIES IN FINLAND

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*Ascorbic acid test, descriptors, environmental effects, fruit quality, Ribes nigrum*

We participate in the trial evaluation of blackcurrant varieties in the COST 863 action, launched in order to optimise the use of genetic resources in small fruit production in Europe. In 2008, cuttings of twenty blackcurrant varieties from four countries have been rooted and grown to small plants. The propagation material of four or five recently released Finnish varieties has been provided to eleven test sites in ten countries. The varieties to be tested are 'Marski', 'Mikael', 'Mortti', and the green-fruited varieties 'Veera' and 'Venla', the latter to be tested in some sites only.

Active evaluation work on blackcurrant is also carried out in Finland in the RIBESCO project, partly funded by the European Commission and designed to improve the level of characterisation and conservation of the northern pool European *Ribes* germplasm. That project includes cultivated currants and gooseberry plant collections. Based on the experience obtained in that project, we recommend some revision and improvements of some descriptors chosen to evaluate blackcurrant varieties in the COST 863 action. We also prefer collecting and keeping the original results of measurements instead of changing the results to an ordinal scale, in order to being able to easier compare the effects of different test sites and environmental conditions.

The results of our earlier studies indicate that a budget method utilising a reflectometer measurement of the content of ascorbic acid in blackcurrant juice can be used instead of more expensive analysis methods. Blackcurrant's red juice requires, however, more complicated sample preparation than berry juice with less intense colour. If the plant vegetation or berry characteristics are documented by photographs, we recommend the use a colour and gray scale control patch, to compare tone values of the original with the reproduced image. The trial design, evaluation of phenotypical variation and cultivation practises are also discussed.

The network for cultivar evaluation of COST863 is highly appreciated by farmer that are interested to intensify their blackcurrant production. It will help them to optimise the choice of the variety instead of keeping in old varieties or randomly choosing among new cultivars currently available internationally.

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# RESULTS OF BLACK CURRANT'S TRIALS IN FERTŐD

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*Keywords: black currant, yield, polyphenol contents*

There are currently (2008) approximately 400 ha of blackcurrant plantations in Hungary. The data of recent years reveal a declining trend, which can be attributed to several causes, such as the low yield average (2.5–4 t/ha), small farm size, low market price, high production costs including high manual labour requirements, cheap imports, and the unfavourable ownership structure of the processing factories, which are in foreign hands and use imported raw materials.

The breeding of blackcurrant started in Hungary in the 1970s, when breeding priorities were an increase in yield, resistance to leaf diseases, and the development of an upright bush form suitable for mechanical harvesting. New priorities are chilling requirement and higher anthocyanine content, together with better tolerance of biotic and abiotic stress factors.

Climate change has a particularly damaging effect on blackcurrant production in Hungary. Warmer winters result in blind buds and the failure of cluster extension. Warmer weather after flower setting causes the green berries to drop. Sunburn symptoms appear on the leaves, resulting in early leaf abscission, as a consequence of which bud differentiation is poor.

The experiment was set up in spring 2002 with six varieties, planted with five plants/plot in three replications. Observations included the collection of phenological data and the measurement of fruit parameters.

Based on the data for 2005–2008, Dorottya and Titania had the highest yields of all the varieties. Both exhibited a high level of stable resistance to leaf diseases. An analysis of chemical components revealed that Dorottya had better parameters for total dry matter and sugar content, but had a lower polyphenol content than Titania.

It could be concluded that Dorottya is capable of giving stable yields. Its upright habit, with many basal shoots, is suitable for mechanical harvesting. It is resistant to fungal leaf diseases and to abiotic stress factors.

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# EVALUATION OF BLUEBERRY VARIETIES IN SLOVENIA

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Keywords: *highbush blueberries, plant data, fruit data, variety list*

Due to pedological and climate characteristic, Slovenia is almost completely covered with bilberries (*Vaccinum myrtillus*). The genus *Vaccinium* is also represented by *V. vitis-idea*, *V. uliginosum* and *V. gaultherioides.* The first experimental station of highbush blueberries in Slovenia was planted on the Ljubljana moor-land by Agricultural Institute of Slovenia in 1962. The largest highbush blueberry fields are situated on the natural peat soil in the Ljubljana moor-land located in the vicinity of the capital in the central part of the country. Smaller blueberry fields are planted on substrates on other locations in Slovenia. On the basis of statistical data there have been 23 ha of intensive blueberry fields since 2002. About 130 t of blueberries are harvested yearly in Slovenia and they are all sold at home, on national market or in market chains. The most widely spread early varieties are Bluetta and Duke, the medium late varieties are Bluecrop, Blueray and Berkeley and the latest varieties are Coville and Elliott. Every year we have from 4 to 5 varieties in introduction. The introduction lasts 8 years. We start measuring the yield in the 6th year of growth. We observe the variety on 15 to 20 bushes mainly in comparison with the standard variety Bluecrop. The criterion for introduction was simplification. We selected only the criteria important for producers. Vigour and habit, time of beginning of flowering, time of beginning of ripening and tolerance to pests and diseases represent plant data. At 3rd picking we describe shape, homogeneity, colour and gustative quality (taste and flesh firmness). We measure the quantity and quality of yield. In the last two years we gave the main emphasis on tolerance against Mummy berry (*Monilinia vaccinii-corymbosi*) and Athracnose Fruit Rot (*Colletotrichum gloesporioides*), which has almost destroyed the production and experimental fields. Some varieties were completely destroyed. All the results are introduced in the yearly publication and every 4 years in the book Slovenian Fruit Cultivar List. All the news is also presented every year at the Blueberry Conference, which is visited by almost all the producers. In the List A, Duke, Bluecrop, Nelson, Coville and Elliott are listed. In the List B there are Bluetta, Spartan, Herbert, Dixi, Brigitta and Rancocas.

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"SMALL BERRY VARIETY EVALUATION"

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# THE VARIETY NETWORK AS EXPECTED BY THE NURSERY ORGANIZATION IN THE SOUTHERN AREA

DANILO BERNARDINI

New Fruits, Strawberry breeding company

Strawberry, variety, network, nursery

New Fruits is a private company which has been working in strawberry breeding since 1992. From 1998 we bred the following varieties: 1998 - 'Maya', 2001 – 'Roxana', 2002 - 'Alba', 2004 - 'Gemma', 2006 - 'Asia', 2008 - 'Syria'. In the year 2008 over 600 hectares of New Fruits varieties was planted. 230.000.000 plants produced (400 Ha) from Italian strawberry nursery industry. 187.000.000 is produced in Italy, 35.000.000 is produced in Poland (fresh p.) and 8.000.000 is produced in Spain (cold stored p.). From the number 130.000.000 plants stay in Italy, 100.000.000 are exported abroad and 70.000.000 are imported from Spain (fresh p.). We expect big cooperation between Public Institute & Private companies, trialers & breeders. Main aims are growing profit for farmers and best strawberry fruits for distributors and for consumers.

The trial objectives for nursery companies are suitability for the different environments, suitability for the different cultivation techniques and good distribution for the different markets.

We propose to add following traits to the strawberry descriptor: production of runners but also their quality ( for nursery), tolerance to pest and diseases also *Collectotricum*., predominant fruit shape also indicate the primary fruits, planting date and density plantation advised, cracking (rain resistance), industrial use suitability, trials also in open fields in straw mulch and in German country.

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## TRIALLING NEW VARIETIES IN NORTHERN EUROPE

PHILIP LIETEN

Fragaria Holland

Strawberry, varieties, trial, North Europe

To get good results in variety trials it is important to have a standardization of the characteristics all the researchers are looking at to evaluate new selections. The information is easy exchangeable this way. On the other hand it is important to start from comparable plant material for all the varieties/selections being used. It is preferable to receive plants from the same nursery or anticipate and propagate from a small quantity of motherplants new plants at the research stations. The plant types send to research stations should be representing the cultural practice of the country or area to be valuable. Usually two standard varieties have to be used in each growing area.

**Waiting bed plants**

Fresh dug plants are transplanted from end of July until mid August into a temporary bed spacing about 1 m. The rooted plants are planted in 4 rows 25 cm apart and 25 cm to 30 cm in line (100.000 plants per hectare). The most favoured option is to plant the cold stored waiting bed plants from April to June for annual cropping outdoors in the summer and fall.

**Cold stored runner plants**

Runner plants are lifted directly from the nursery in December and January without having been transplanted previously. After digging the stolones and leaves of the runner plants are trimmed, then they are graded into various size categories depending on the diameter of the crown.

*A+ runner plants which have a crown diameter above 15 mm. A+ plants are preferred for early and late production in glasshouses and tunnels as they produce large fruit of good quality

*A runner plants are graded between 12 and 15 mm crown diameter. These plants usually tend to give 2 inflorescences which equals 15 to 20 fruits. Tthe A graded plants are traditionally planted in May, June, July, August (depending on the area) to be harvested in summer. However, if plant performance of the A runner plants is disappointing in the summer the emerging flower stalks are removed and the runner plants are overwintered and harvested next spring during the traditional season outdoors.

**Tray plants**

Since the early nineties there has been a tendency to grow tray plants for long cold storage. Nowadays in The Netherlands and Belgium an estimated 95 % of the plantmaterial used for the substrate culture in the fall under protection are tray plants. In trials on substrate there is a preference for trayplants wich have to be compared with Elsanta variety.

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