

Research Note

Jenkka and Jatsi, two new red raspberry cultivars

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The red raspberry (*Rubus idaeus* L.) cultivars Jenkka and Jatsi have been released from the berry breeding programme of the Agricultural Research Centre of Finland. Cv. Jenkka was selected for its good winterhardiness and reliable yield, and cv. Jatsi for its good flavour, large fruit size and moderate winterhardiness. Both cultivars are suitable for the fresh and pick-your-own market.

Key words: breeding, flavour, fruit size, *Rubus*, winterhardiness

Introduction

Breeding of *Rubus* species in Finland was launched in 1939 at the Institute of Horticulture with hybridization between the red raspberry and arctic bramble (*Rubus arcticus* L.). The aim was to develop a berry plant that would combine the aroma of the arctic bramble with the cultivation properties of the red raspberry. As a result of the breeding work, two nectar raspberry varieties were released for cultivation; cv. Heija ('Malling Promise' x Merva) in 1975 (Hiirsalmi and Säkö 1976) and cv. Heisa ('Malling Promise' x Merva) in 1981 (Hiirsalmi and Säkö 1981). The nectar raspberry cultivars have not been grown on a large scale.

Since 1973, Finnish wild strains of red raspberry have been used as parents in breeding

owing to their winterhardiness and good flavour. The foreign cultivars used for crossing have been 'Boyne', 'Carnival', 'Comet', 'Glen Clova', 'Indian Summer', 'Malling Promise', 'Muskoka', 'Ottawa' and 'Veten'. In 1988, a cultivar selected from the progeny of a cross between cv. Ottawa and a natural strain originating from Mäntsälä, southern Finland, was introduced onto the market under the name Ville (Hiirsalmi and Laurinen 1990). The fruit of the cultivar is small and has a fine aroma resembling that of wild raspberry. Cv. Ville is mainly grown in home gardens.

The varieties currently most widely cultivated are cv. Ottawa ('Viking' x (Loganberry x 'St.Regis')) and cv. Muskoka ('Newman 23' x 'Herbert'), both originating from Ontario, Canada (Blair 1950). As poor overwintering has been the most important factor limiting cultivation of

the foreign raspberry varieties in Finland, the major aim of our breeding programme has been to improve winterhardiness. Other important objectives have been to increase yield and to improve characteristics important for the fresh market such as fruit size, flavour and firmness.

Origin and clone trials

The new cultivars were selected from a material of about 2000 seedlings crossed at the Institute of Horticulture in the 1970s and 1980s. Cv. Jenkka (tested as 73120020) originates from a cross of ('Malling Promise' x Merva) x 'Ottawa', and cv. Jatsi (tested as 73130021) from a cross of 'Ottawa' x ('Malling Promise' x Merva) made in 1973. Cv. Malling Promise is a cross of 'Newburgh' x ('Pyne's Royal' x 'Lloyd George') introduced in the UK in 1944 (Grubb 1935, Jennings 1988). Merva is an individual of the F₃ generation obtained through free pollination from the cross between red raspberry and arctic bramble (Hiirsalmi and Säkö 1976).

The initial selection of seedlings was made at the Institute of Horticulture in Piikkiö (60°23' N and 22°33' E). Clone trials were then planted in spring 1988 at four locations: Institute of Horticulture in Piikkiö, the Häme Research Station in Pälkäne (61°20' N and 24°13' E), the Research Station for Ecological Agriculture in Mikkeli (61°40' N and 27°13' E), and the North Ostrobothnia Research Station in Ruukki (64°41' N and 25°06' E). In the trials, new selections were compared with cvs Muskoka, Heisa and Ville and, since 1990, cv. Ottawa.

Selections were propagated by root cuttings at Piikkiö. The plants of control cultivars were virus-free and micropropagated at the Laukaa Research and Elite Plant Station. Ten plants of each selection/cultivar were planted per plot without replicates. In planting, the distance between plants was 50 cm in rows, and the row width varied from 2.5 m to 5 m depending on the location.

Winterhardiness was estimated twice in spring at 2-week intervals. Both vigour and spine intensity were estimated at the beginning of harvesting. The scale used for each of these properties was from 1 to 9, with 9 indicating no winter injury, highly vigorous plants and smooth coloured basal spots only. Cane height was measured at the end of growing seasons.

Berries were picked twice a week, and those which were not marketable were separated. These included very soft, broken or malformed berries, mouldy berries, and berries damaged by the raspberry beetle (*Byturus tomentosus* (Degeer)). The weight of 100 berries was measured when each plot was picked for the second and fifth time, and the fruit characteristics – flavour, acidity and aroma – were evaluated on a scale from 1 to 9, where 9 indicated superior or outstanding properties. Coherence between drupelets was determined by rolling the fruit between thumb and forefinger, and firmness by pressing the fruit slightly between thumb and forefinger. The characteristics and yield records were evaluated in 1990, 1991 and 1992, and the observations required by the technical questionnaire (TG/43/6) of UPOV (Union Internationale pour la Protection des Obtentions Vegetales) were carried out in 1994.

Performance and description of cv. Jenkka

Cv. Jenkka overwintered as well as or better than the control cultivars. At the northernmost location, Ruukki, cv. Jenkka was the most winterhardy, although it was injured to some extent every winter from 1989 to 1992. During that period the winters were not exceptionally cold, the lowest temperature measured at Ruukki being -29.3 °C.

At Piikkiö and Ruukki the yield of cv. Jenkka was higher than that of cv. Muskoka; at

Table 1. Comparison of red raspberry cultivars at four locations. Mean marketable yield in 1990, 1991 and 1992 (kg/row metre). Planting in spring 1988.

Cultivar	Piikkiö	Pälkäne	Mikkeli	Ruukki
Jenkka	1.990	0.910	2.280	0.890
Jatsi	1.810	1.170	1.660	0.410
Muskoka	1.180	0.910	2.450	0.270
Heisa	1.790	2.350	1.640	0.100
Ville	1.130	1.400	1.630	0.330

Pälkäne and Mikkeli the yields of both cultivars were similar (Table 1). At all locations, except Pälkäne cv. Jenkka gave higher yields than cvs Ville and Heisa. The crop of cv. Jenkka ripened later than that of cvs Muskoka and Heisa but earlier than that of cv. Ville. The first harvest date of cv. Jenkka was 2–3 days later than that of cv. Muskoka.

The fruit of cv. Jenkka was about the same size as that of cvs Muskoka and Heisa but smaller than that of cv. Ottawa, and much heavier than that of cv. Ville. Depending on the year and location, the fruit size of cv. Jenkka ranged from 1.50 g to 2.53 g, and that of cv. Muskoka from 1.12 g to 2.57 g. The results of the flavour evaluations varied, but the flavour of cv. Jenkka was most often estimated to be similar to that of cv. Muskoka. The flavour of cv. Ville was always ranked the best. In 1993, the vitamin C content was 37.16 mg/100 g in the fruit of cv. Jenkka, 30.54 mg in that of cv. Muskoka, and 18.41 mg in that of cv. Ville.

The fruit of cv. Jenkka was medium red and glossy. The firmness and coherency of berries were evaluated slightly higher than those of cv. Muskoka, and much higher than those of cv. Ville. The fruit shape of cv. Jenkka was round (as long as broad), and the adherence to plug stronger than that of cv. Muskoka. Fruiting laterals were shorter in cv. Jenkka than in cvs Muskoka and Ottawa.

The canes of cv. Jenkka were thin and flexible like those of cv. Muskoka. In autumn 1990, 1991 and 1992, the cane height of cv. Jenkka varied between 120 and 200 cm, and that of cv.

Muskoka between 95 and 195 cm. The number of young shoots in cv. Jenkka was as high as in cv. Muskoka. The dormant cane colour of cv. Jenkka was greyish brown to brown, and there was a weak bloom in the full-grown shoots. Spines were denser in the shoots of cv. Jenkka than in cv. Muskoka. The colour of the spines varied from brownish purple to purple.

The leaves of cv. Jenkka sometimes had three, sometimes five leaflets. The leaflets did not touch each other, and stalklets were very short. Relief between the leaf veins was medium. Flowers were of medium size, and anthocyanin coloration of the pedicel was of medium intensity.

In 1990 and 1991, the leaves of cv. Jenkka were infested by powdery mildew (*Sphaerotheca alchemillae* (Grev.) Junell), but the leaves of cv. Muskoka were symptom free. The first case of raspberry bushy dwarf virus (RBDV) infection was found in the experimental field at Mikkeli in spring 1989. In June 1995, when plants were tested for the last time, cvs Jenkka and Muskoka were negative but cvs Ville and Ottawa positive for the RBDV infection.

We recommend cv. Jenkka for production in regions where overwintering of the main cultivars, Ottawa and Muskoka, is poor. Owing to its better winterhardiness, cv. Jenkka has a higher average yield than cvs Ottawa and Muskoka, and cropping is more reliable. The fruit size, flavour and firmness of cv. Jenkka are similar to those of cv. Muskoka. In addition, it resembles cv. Muskoka in growth habit as there is a large number of thin and flexible canes, which makes pruning and supporting laborious.

Performance and description of cv. Jatsi

The fruit of cv. Jatsi was bigger than that of the control cultivars. Depending on the year and location, the fruit weighed from 2.00 g to 3.41 g. The results of the taste evaluation varied, but the flavour of cv. Jatsi was most often ranked better than that of cvs Muskoka, Ottawa and Heisa. In 1993, the vitamin C content was 31.72 mg/100 g in the fruit of cv. Jatsi.

Overwintering of cv. Jatsi was similar to that of the control cultivars at Pälkäne and Ruukki, but poorer than that at Piikkiö and Mikkeli. The yield of cv. Jatsi was higher than that of cv. Muskoka at all locations except Mikkeli (Table 1). In the northernmost location, Ruukki, the yield of cv. Jatsi was as high as or higher than that of the control cultivars. The Jatsi crop ripened later than that of cvs Muskoka and Heisa but earlier than that of cv. Ville. The first harvest date of cv. Jatsi was 1–3 days later than that of cv. Muskoka.

Cv. Jatsi was ranked higher than the control cultivars in fruit firmness and coherency. The berries were medium red with weak glossiness; the colour did not appear as dark as that of the cv. Muskoka fruit. The fruit of cv. Jatsi was much longer than broad. The adherence to plug was much stronger than that of the fruit of cv. Muskoka, which may make cv. Jatsi more difficult to pick. The fruiting laterals of cv. Jatsi were as long as those of cvs Ottawa and Muskoka.

The canes of cv. Jatsi were thick and sturdy

like those of cv. Ottawa. In autumn the cane height of cv. Jatsi varied from 145 cm to 255 cm. The number of young shoots was as high as that of cv. Ottawa but lower than that of cv. Muskoka. There were no sharp spines on the canes of cv. Jatsi. Spines were sparse in young shoots, and the colour of the spines varied from green to brownish green. The intensity of anthocyanin coloration of very young shoots and that of basal spots was low. In autumn, there was a weak bloom in the full-grown shoots. The dormant canes were greyish brown.

The leaves of cv. Jatsi sometimes had three, sometimes five leaflets. The leaflets did not touch each other, and stalklets were very short. Relief between the leaf veins was strong. Flowers were of medium size, and the intensity of anthocyanin coloration of the pedicel was very weak.

Cv. Jatsi was infested by powdery mildew in 1991, and was negative for RBDV infection in June 1995.

We recommend cv. Jatsi for production due to its good flavour and large fruit. The winter-hardiness of the new cultivar is no better than that of cvs Ottawa and Muskoka. When winter damage does not occur, however, cv. Jatsi may yield more than either of those cultivars. In growth habit, cv. Jatsi resembles cv. Ottawa as the number of canes is low and the canes are sturdy, upright and long. It is therefore easier to prune and support than cv. Muskoka. Moreover, the long canes make V-type of supporting appropriate. Owing to the strong adherence to plug the new cultivar is not recommended for machine harvesting.

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SELOSTUS

Uudet suomalaiset vadelmalajikkeet Jenkka ja Jatsi

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Maatalouden tutkimuskeskus

Kaksi uutta vadelmalajiketta Jenkka ja Jatsi on las-kettu viljelyyn Maatalouden tutkimuskeskuksen mar-jakasvien jalostusohjelman tuloksena. Lajikkeet on valittu 1970- ja 1980-luvuilla Puutarhatuotannon tut-kimuslaitoksella Piikkiössä tehdystä lähes 2000 sie-mentaimen risteytysaineistosta. 'Jenkka' on peräisin v. 1973 tehdystä risteytyksestä ('Malling Promise' x Merva) x 'Ottawa' ja 'Jatsi' risteytyksestä 'Ottawa' x ('Malling Promise' x Merva). Lajikkeiden perimäs-tä löytyy hivien mesimarjaa, sillä Merva on vadelman ja mesimarjan välisen hybridin kolmannen polven va-paapölytysjälkeläinen. Risteytysaineiston alkukarsin-ta tehtiin Piikkiössä. Keväällä 1988 lupaavimmat ja-losteet istutettiin kloonikokeisiin Piikkiön lisäksi Hämeen tutkimusasemalle Pälkäneelle, Ekologisen tuotannon tutkimusasemalle Mikkelin maalaiskuntaan ja Pohjois-Pohjanmaan tutkimusasemalle Ruukkiin. Verrannelajikkeina olivat Muskoka, Heisa ja Ville sekä vuodesta 1990 lähtien myös Ottava. Vuosina 1990–1992 tehtiin yksityiskohtaiset havainnot talveh-timisestä, kasvuominaisuuksista, satoisuudesta ja marjojen laadusta. Kasvukaudella 1994 tietoja täy-dennettiin UPOV-järjestön (Union Internationale pour la Protection des Obtentions Vegetales) vaatimusten mukaisesti.

Vadelmalajike Jenkka

Jenkka valittiin lajikkeeksi ennen kaikkea talvenkes-tävyytensä ja viljelyvarmuutensa vuoksi. Se talvehti kaikilla koepaikoilla yhtä hyvin tai paremmin kuin verrannelajikkeet. Pohjoisimmalla koepaikalla Ruu-kissa 'Jenkka' oli talvenkestävyydeltään selvästi pa-ras lajike, mutta myös se vioittui lievästi joka talvi v 1989–1992. Koejaksolle ei sattunut poikkeukselli-sen ankaria talvia, sillä alin Ruukissa mitattu lämpö-tila oli $-29,3$ °C.

'Jenkka' oli Piikkiössä ja Ruukissa satoisampi kuin 'Muskoka', sen sijaan Pälkäneellä ja Mikkeli-sä lajikkeiden sadot olivat yhtä suuret. Marjat olivat kiiltävän punaiset, muodoltaan lähes pyöreät ja kool-taan samansuuruiset kuin 'Muskokan' marjat. 'Jen-

kan' marjakoko vaihteli eri vuosina eri koepaikoilla 1,50–2,53 g ja 'Muskokan' vastaavasti 1,12–2,57 g. Maku vaihteli, mutta useimmiten 'Jenkan' maku arvosteltiin lähes yhtä hyväksi kuin 'Muskokan' maku. Ville-lajikkeen marjat arvosteltiin aina näitä mauk-kaammiksi.

Jenkka-lajikkeen versot olivat ohuita ja rentoja kuten 'Muskokan' versot. 'Jenkan' versojen pituus vaihteli syksyisin 120 cm:stä 200 cm:iin ja 'Musko-kan' 95 cm:stä 195 cm:iin. 'Jenkan' versoissa esiin-tyi lievästi härmää vuosina 1990 ja 1991; 'Musko-kan' versoissa härmää ei näkynyt.

Jenkka-lajiketta suositellaan viljelyyn alueille, joilla on ongelmia nykyisten vadelmalajikkeiden tal-venkestävyydessä. Paremman talvenkestävyytensä ansiosta 'Jenkka' on viljelyvarmempi ja keskimäärin satoisampi kuin 'Muskoka' ja 'Ottawa'. Marjat ovat kooltaan, maultaan ja kiinteydeltään kuten 'Musko-kan' marjat. Myös kasvutavaltaan lajike muistuttaa 'Muskokaa', sillä ohuita ja rentoja versoja kehitty-y runsaasti, joten leikkaus- ja tuentatyötä on paljon.

Vadelmalajike Jatsi

Jatsi-lajikkeen talvenkestävyys oli Piikkiössä ja Mik-kelissä heikompi kuin 'Muskokan', 'Heisan', 'Villen' ja 'Ottawan', mutta Pälkäneellä ja Ruukissa 'Jatsi' talvehti yhtä hyvin kuin verrannelajikkeet. Sen sato oli 'Muskokan' satoa suurempi Mikkeliä lukuun ot-tamatta kaikilla koepaikoilla.

'Jatsin' marjat olivat suuremmat kuin verranne-lajikkeiden. Marjakoko oli eri kokeissa ja eri vuosi-na 2,00–3,41 g. Marjojen maku arvosteltiin yleensä paremmaksi kuin 'Muskokan', mutta maku ei yltä-nyt 'Villen' maun tasolle. 'Jatsin' marjat olivat muo-doltaan pitkulaisia, väriltään himmeän punaisia ja hieman vaaleampia kuin 'Muskokan' marjat. Kiin-teys ja koossapysyminen arvioitiin paremmaksi kuin verrannelajikkeiden marjojen. 'Jatsin' marjat olivat tiukasti kiinni kukkapohjuksessa, mikä saattaa vai-keuttaa poimintaa.

Jatsi-lajikkeen versot olivat paksuhkot ja jäykät

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kuten 'Ottawan' versot. Versojen pituus vaihteli syksyisin 145 cm:stä 255 cm:iin. 'Jatsin' versoissa ei ollut pistäviä piikkejä. Versoissa esiintyi härmää kesällä 1991.

Jatsi-lajiketta suositellaan viljelyyn marjojen hyvän maun ja suuren koon vuoksi. Talvenkestävyys ei ole parempi kuin nykyisten viljelylajikkeiden, mutta 'Jatsin' sato on hyvä, jos pahoja talvivaurioita ei esiinny. 'Jatsi' muistuttaa kasvutavaltaan Ottawa-la-

jiketta, sillä jäykkiä ja pitkiä versoja kehittyi vain kohtalaisesti, joten leikkaus ja tuenta on helpompaa kuin Muskoka-lajikkeeseen. Pitkien versojen vuoksi 'Jatsi' soveltuu hyvin V-tuentaan.

Lajikkeet ovat puhdistettavina mahdollisista taudista ja tuholaisista Laukaan tutkimus- ja valiotai-
miasemalla. On mahdollista, että lajikkeet saadaan tervetaituottajille lisäykseen keväällä 1997 ja istutettaviksi käytännön viljelyksille syksyllä 1997.