Preliminary evaluation results of new plum cultivars in a dense planting

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ABSTRACT: Sixteen new plum cultivars mostly bred in Germany were tested together with several standards in a high density experimental orchard established at Holovousy in the spring of 2004 with spacing 5 × 1.5 m. Trees were trained as spindles on St. Julian A rootstock. In the orchard the following characteristics were evaluated: tree vigour based upon measuring of trunk-cross section area and canopy volume, yields, time of flowering, time of fruit ripening and basic parameters of fruit quality. The highest yields and precocity of fruiting were recorded on cultivars Tophit, Jojo, Elena, and President, whereas the least productive were Ruth Gerstetter, Anna Späth, and Topgigant Plus. Cultivars Katinka, Jojo, Topper, and Empress had the highest values of yield efficiency whilst the lowest ones were recorded on Topgigant Plus and Anna Späth. All evaluated cultivars were characterized by mean start of fruit ripening and length of harvest period. Topgigant Plus had the largest fruits (mean 75.9 g) followed by Bluefre, Empress and Tophit, whereas the smallest ones were recorded in Katinka, Gabrovská and Valjevka. The highest scores for fruit quality were given to Hanita, Tophit and Presenta. New cultivar Tophit was the most remarkable regarding all evaluated characteristics including its time of ripening that would prolong the season of commercially grown fresh fruit cultivars for use in the Czech Republic.

Keywords: plum; cultivars; tree vigour; time of ripening; yields; fruit size; fruit quality

In the Czech Republic, like in most European countries, plums were grown until practically the end of the last century in traditional orchards of standard or semi-standard trees planted in densities between 100 and 400 per ha. Economically important yields typically began in the 6th year after planting or later. Selected clones of Domestic Prune and Green Gage, then Stanley, with some tolerance to *Plum pox virus*, and since eighties also Čačanska lepotica or Čačanska najbolja were predominately planted there. The production was mainly harvested mechanically by shakers and used for processing or drying. In the last 15 years increase in demands for fresh plums for direct consumption contributed to establishing a new more intensive type of plum orchards with earlier cropping to supply fruits of better quality for this intended purpose (Blažek, Kneifel 2005).

In most current *Prunus domestica* L. breeding programmes throughout the world, attention has focussed on improvement of fruit quality, prolonging of the harvest season and on resistance or tolerance to *Plum pox virus* (Okie, Weinberger 1996; Hartmann, Petruschke 2002; Blažek 2007). In Europe a majority of new plum and prune cultivars have been bred in Germany thanks to two extensive breeding programmes at the universities in Hohenheim and Geisenheim (Hartmann 1998, 2007; Jacob 1999, 2002a,b, 2007). New interesting cultivars of the species have also been bred in Bulgaria (Vitanova et al. 2007) and in Serbia (Nenadović-Mratinić et al. 2007). A range of the new cultivars from these institutions and others bred in USA or Canada were recommended for use or for testing in new systems of plum growing (Hodun et al. 1998; Grzyb, Rozpara 2000; Hartmann, Fischer 2003).

In the Czech Republic the first experimental orchard with several new cultivars on two rootstocks in a dense spacing was established at Holovousy 1998. In that testing cultivars Valor and Empress had the best performance of tree growth, bearing habit and fruit size, indicating their suitability for the modern types of plum orchards (Blažek et al. 2004, 2006). Utilizing this experience, the second experimental orchard of this type was established

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at Holovousy into which mainly new plum cultivars from Germany were planted together with several standard ones like President that in some extend had been previously used for renovation of plum orchards also in this country. The present paper reports on the results obtained from the first three years of fruiting of the orchards.

MATERIAL AND METHODS

The experimental orchard was established during autumn 2004 at Holovousy. One year old trees of twenty-three cultivars grafted on the rootstock St. Julien A were planted in a spacing 5 m between the rows and 1.5 m between trees within the row mostly in 3 replications per 3 trees in each. The only exception in this scheme were 7 new cultivars from Germany (Top 2000, Topfirst, Topfive, Topgigant Plus, Topper, Topstar Plus, and Toptaste) which because of lack of source material only 3 trees each were available after summer budding. For every replication of cultivar and rootstock 3 trees were planted. Cultivars Ruth Gerstetter and Anna Späth were used in this experiment as standards for comparison of time of ripening.

Climatic conditions of Holovousy are characterized by the average annual temperature of 8.1°C and the average annual rainfall of 650 mm. The soil was medium loam sandy with rather deep cultivated layer on gravely substrate. The orchard was located at the altitude of 280 m a.s.l. Experimental trees were trained as spindles using strong wooden stakes as supports. No irrigation was applied in the orchard. Clean strips were kept under trees by contact herbicides whereas frequently cut sod was kept in alleys between tree rows. Fertilizers were applied according to soil analyses. Spraying treatments against pests and diseases were conducted according to the recommendations used for commercial orchards.

The following records were taken annually: trunk circumference (for calculation of trunk cross-section area), canopy diameter (in two opposite directions), canopy height and fruit yield per tree. The date when harvest ripening started was estimated for each cultivar considering typical colouring of the majority of fruits, strength of fruit stem attachment and taste of fruit samples. On that date samples of 50 fruits were taken at random from each replication.

Fruit samples were individually assessed for mean fruit weight, flesh firmness (based on the Instron measuring of 10 fruits), soluble solids content (in juice of fruits measured by digital refractometer PR 101) and by organoleptic assessment of several characteristics using a 1–9 rating scale in which 9 corresponds to the best performance. The total fruit quality comprised both appearance and "eating quality" (taste, firmness etc.) expressed by a single number. Fruit samples during harvest time of each cultivar were taken repeatedly in interval 3 to 5 days (usually 3 or 4 times) for determining the length of its harvest period. Ripening dates were referenced to the number of days after the ripening date of Ruth Gerstetter for comparison of the characteristics from different years. All data were statistically evaluated by an analysis of variance.

RESULTS

Tree vigour

This characteristic was expressed by cross sectional area and canopy volume calculated upon measuring of trees after growing season 2008. Their mean values and spans for each cultivar are given in Table 1. The most vigorous were trees of cultivar Tophit which were nearly double in size compared with trees of least vigour cultivar Topper. Besides Tophit, trees of cultivars Tegera and Elena were significantly more vigorous than the average, whereas significantly weaker growth than average was displayed in cultivars Topfirst, Topstar Plus, Katinka and Top 2000. The remainder were of medium vigour and mostly these cultivars were not significantly different from one another.

Yields and yield efficiency

The highest total yield for the first 3 years of cropping (19.5 kg) was noted for trees of cultivar Tophit. Its yield was nearly 3 times higher than total yield of the least cropping trees of Ruth Gerstetter (Table 2). With Tophit in 2008 (in the third year of cropping) 13.8 kg of fruits per tree were harvested, corresponding to the yield 18.4 t/ha. Nearly the same total yields like Tophit were observed for cultivars Jojo (19.3 kg) and Empress (19.1 kg). Likewise total yield of standard cultivar President did not differ significantly from these values. On the other hand the lowest total yields after standard Ruth Gerstetter were also recorded on trees of Anna Späth and Topgigant Plus. Considering yields in the first year of cropping, cultivars Tophit, President and Jojo were the most precocious, whereas Anna Späth, Oneida and Gabrovská the least. The highest yield efficiencies in 2007 were recorded in cultivars Katinka and Topper which were closely

Table 1. Vigour of trees after the season 2008 expressed in the trunk-cross section area and canopy volume

Cultivar	Trunk-cross section area (cm^2)				Canopy volume (m^3)			
	mean	% of total	min.	max.	mean	% of total	min.	max.
Anna Späth	25.1	96	22.6	28.3	2.8	86	2.8	3.1
Bluefre	27.6	106	22.2	29.6	3.6	110	3.4	3.9
Elena	31.9	123	28.7	32.5	3.9	121	3.5	4.2
Empress	29.3	113	26.9	30.5	3.7	114	3.5	3.9
Gabrovská	26.5	102	23.3	29.2	3.2	99	2.8	3.6
Hanita	29.2	112	25.3	34.5	3.5	106	3.2	3.8
Jojo	23.9	92	19.2	28.3	2.9	90	2.7	3.3
Katinka	23.3	89	19.6	26.0	2.7	83	2.5	2.9
Oneida	29.3	113	24.4	34.0	3.8	118	3.6	4.1
Presenta	25.9	99	19.5	30.6	3.0	92	2.6	3.4
President	29.6	114	26.2	30.7	3.7	113	3.4	4.0
Ruth Gerstetter	23.9	92	17.6	26.3	3.0	92	2.6	3.3
Tegera	32.4	125	27.3	32.8	4.0	124	3.7	4.2
Top 2000	23.1	89	17.5	26.5	2.9	89	2.6	3.3
Topfirst	20.4	79	17.5	22.8	2.5	77	2.2	2.9
Topfive	23.8	92	19.6	27.2	3.2	99	2.9	3.6
Topgigant Plus	24.5	94	19.8	29.6	3.3	102	3.0	3.5
Tophit	33.3	128	29.6	38.2	4.1	127	3.7	4.4
Topper	17.6	68	16.0	20.2	2.2	69	1.7	2.5
Topstar Plus	22.8	88	17.8	27.7	2.7	83	2.4	3.0
Toptaste	23.5	90	19.3	26.8	3.0	92	2.5	3.4
Valjevka	27.8	107	25.1	30.5	3.5	107	3.2	3.7
Valor	25.7	99	22.2	30.2	3.3	102	3.0	3.8
Total mean	26.11	100			3.25	100		
LSD ($P = 0.05$)	4.15				0.47			

followed by Top 2000 and Valor. In the following year, Katinka had highest yield efficiency, followed by Jojo, Topper and Empress. The lowest yield efficiencies in 2007 were recorded on trees of Anna Späth and in 2008 on trees of Ruth Gerstetter and Topgigant Plus.

Time of flowering and harvest ripening

The earliest season of plum flowering took place at Holovousy in 2007 when the first flowers appeared on the cultivars Topfirst and Topstar Plus on April 14th (that is on the 104th calendar order), whereas the latest flowering was observed there in 2006 when the first flowers were observed as late as (on cultivars Katinka and Ruth Gerstetter) on the May 1st (on 121st day of calendar order). According to mean start day of flowering in the observed years presented in Table 3, evaluated cultivars could be roughly divided into 3 or 4 groups. Within the group with early flowering dates belonged Katinka, Ruth Gerstetter, Topfirst and Topstar Plus. Cultivars Jojo and Tegera started flowering, on average, only one day later. The latest start of flowering was recorded with Valjevka, Oneida and Top 2000, about one week later than in the first group.

The earliest beginning of the harvest season in all 3 years was recorded with standard cultivar Ruth Gerstetter (on the July 9th on the average). Fruits of Topfirst were on the average, ready for harvest only

Table 2. Yields per tree and yield efficiency of evaluated cultivars

Cultivar	Yield per tree (kg)				Yield efficiency (kg/m^3) of canopy volume	
	2006	2007	2008	Σ 2006–2008	2007	2008
Anna Späth	0	0.4	6.9	7.2	0.4	1.9
Bluefre	0.8	4.2	9.1	14.1	2.2	2.9
Elena	0.3	2.9	7.8	10.9	1.4	2.1
Empress	1.1	5.5	11.5	19.1	2.5	3.4
Gabrovská	0	4.1	9.7	14.3	2.2	3.0
Hanita	1.0	4.5	8.9	14.4	2.1	2.5
Jojo	1.3	4.7	10.6	19.3	2.4	3.6
Katinka	1.2	4.8	10.0	17.6	2.8	3.7
Oneida	0	2.2	8.9	11.0	1.2	2.6
Presenta	0.4	1.9	9.6	11.9	1.1	3.2
President	1.4	4.6	12.6	18.5	2.1	3.4
Ruth Gerstetter	0.2	3.6	4.4	7.1	2.3	1.5
Tegera	0.7	4.8	10.4	15.9	1.9	2.6
Top 2000	1.1	4.9	7.4	14.3	2.7	2.6
Topfirst	0.3	3.1	6.0	11.2	2.3	2.4
Topfive	0.6	4.1	6.7	11.3	2.1	2.1
Topgigant Plus	0.4	2.4	5.7	7.7	1.4	1.7
Tophit	1.6	4.1	13.8	19.5	1.5	3.2
Topper	1.0	4.3	9.5	14.9	2.8	3.6
Topstar Plus	0.5	3.5	7.0	11.5	2.4	2.6
Toptaste	0.8	2.3	8.7	11.8	1.5	2.9
Valjevka	0.5	2.1	8.5	11.2	1.0	2.4
Valor	0.9	5.2	10.6	16.7	2.6	3.1
Total mean	0.7	3.7	8.9	13.6	2.0	2.7
LSD (P = 0.05)	1.0	1.6	2.1	2.5	0.6	0.8

7 days later and those of the new cultivar Katinka 17 days later. Following in their sequence of ripening were Tegera, ready for harvest at the end of July and Hanita, roughly in the middle of August. Next in the sequence were cultivars Topstar Plus and Topfive, nearly at the same time, then Gabrovská, Toptaste and Topgigant Plus (the third decade of August), Valor, Valjevka, Empress, Bluefre and Jojo (end of August), Topper, Oneida and Top 2000 (the first decade of September), President, Elena and Anna Späth, Tophit (the second decade of September), Tophit (the last decade of September) and Presenta, the latest one, at the end of September.

Mean time of harvest ripening is given in Fig. 1. Generally cultivars ripening in July or in the first decade of August had a ripening period shorter than those harvested in September. The other factor that influenced length of the period was the yield level or fruit set, as high yield usually provided a longer harvest period and *vice versa*. Similarly less uniform fruit ripening usually connected with time of flowering also frequently prolonged this period. Some cultivars, but especially with Valor, the time of the optimum harvest was shorter because fruits lost their firmness rapidly.

Fruit weight and its dimensions

The mean fruit weight, its variation, and the main dimensions of evaluated cultivars are presented in Table 4. The biggest fruits were recorded with Topgigant Plus, having an average fruit weight of 75.9 g and ranging between 56.1 g and 82.1 g. The next according to mean fruit size was

Table 3. Start of flowering and fruit ripening in calander days

Cultivar	Start of flowering				Start of fruit ripening			
	2006	2007	2008	mean	2006	2007	2008	mean
Anna Späth	125	113	117	118	270	254	267	263
Bluefre	124	111	113	116	250	233	242	242
Elena	122	109	112	114	266	256	264	262
Empress	123	110	112	116	260	250	259	256
Gabrovská		112	114			230	239	
Hanita	124	108	110	114	236	222	233	230
Jojo	122	107	110	113	248	237	247	244
Katinka	121	106	109	112	212	200	209	207
Oneida		114	117			247	255	
Presenta	123	107	111	114	276	264	273	271
President	122	107	110	113	267	254	264	262
Ruth Gerstetter	121	106	108	112	196	181	192	190
Tegera	122	107	110	113	216	203	213	211
Top 2000	126	115	117	119	260	243	256	253
Topfirst	122	104	109	112	203	190	200	197
Topfive	124	109	112	115	234	222	231	229
Topgigant Plus	123	109	110	114	242	232	238	237
Tophit	125	109	112	115	271	260	270	267
Topper	125	110	113	116	255	239	251	248
Topstar Plus	122	104	109	112	233	223	228	228
Toptaste	125	111	114	117	241	227	238	234
Valjevka	127	114	118	120	248	233	245	241
Valor	122	110	113	115	245	230	243	239
Total mean	124	109	112	115	242	228	239	236

Bluefre with a mean fruit weight of 58.4 g and with the largest fruits weighted nearly 70 g. The next in sequence were Empress 54.2 g, Tophit 53.0 g, President 50.8 g, Valor 48.4 g and Oneida 47.9 g. On the contrary the smallest mean fruit weights belonged with Katinka, averaging only 21.8 g. After Katinka the following cultivars ranged with increasing fruit weight: Gabrovská (25.6 g), Topfive (27.6 g), Valjevka (28.3 g), Presenta (28.7 g) and Elena (29.1 g). All reminding cultivars could be classified like plums with medium fruit size.

Stone weight and flesh adherence to stone

Mean values of both characteristics are given in Table 4. The smallest value of stone weights was recorded in Katinka (1.0 g) whereas cultivar Topgigant Plus had stones with a mean weight of 2.4 g. Small stones were further typical for cultivars Topfive and Elena. A great majority of evaluated cultivars were freestone with rating values of 8 or 9. The most adherent stones were recorded in Bluefre (mean rating 5.8) and sometimes also in Oneida, Empress, Presenta, Valor and Elena.

Taste and flavour

The highest scores both for taste and flavour were recorded in Hanita and Presenta (Table 5). Also Tophit received a very good rating for taste, but its flavour was somewhat less pronounced. High ratings for both characteristics were further received by Toptaste and Valjevka, and in the taste alone by Elena, Tegera and partly also by Gabrovská. The

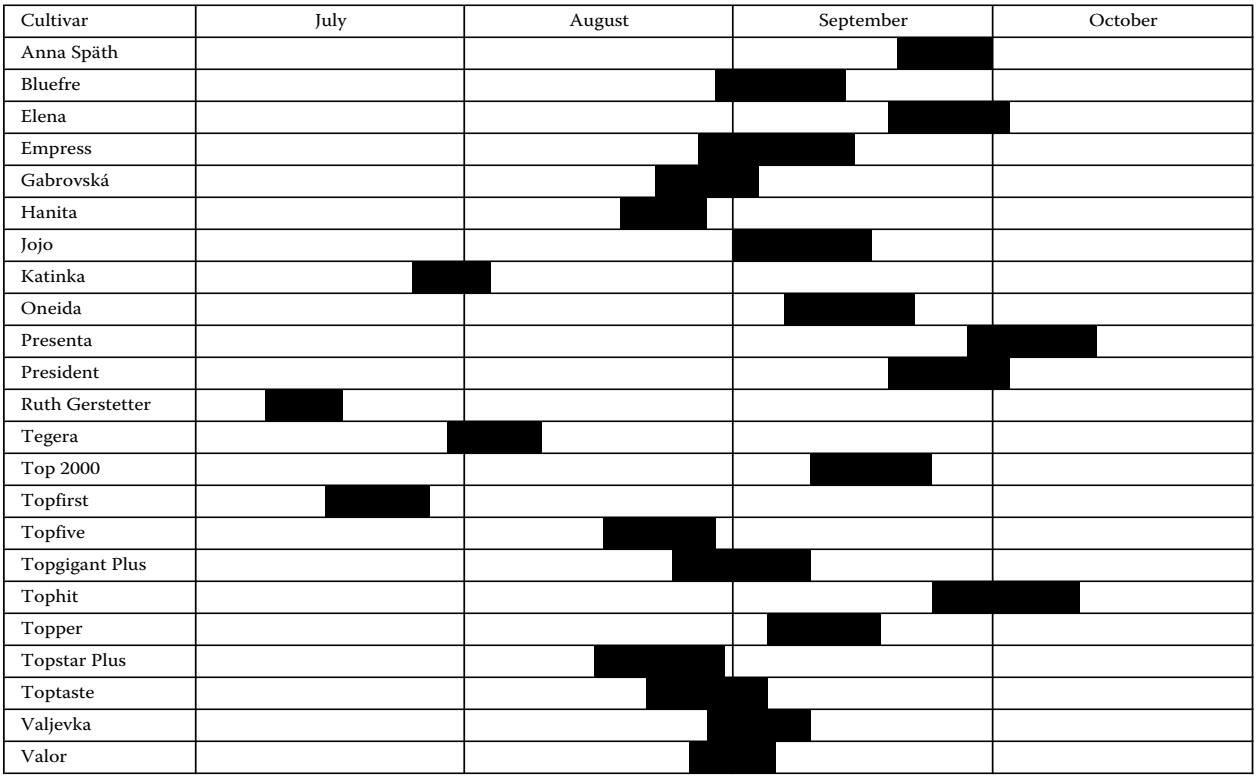

Fig. 1. Mean harvest time of evaluated cultivars

lowest ratings of both taste and flavour were given to standard cultivar Ruth Gerstetter, then to Topfirst and Topgigant Plus. For only flavour lowest scores were received for Bluefre and Valor.

Total fruit quality

The highest rating (8.2) of the characteristic was given to Hanita and Tophit. Nearly the same rating (8.0) was received by Presenta and scores not much lower were also received for Toptaste and Valjevka. On the contrary the lowest rating for total fruit quality was again given to standard cultivar Ruth Gerstetter, and not much better were cultivars Topgigant Plus and Valor.

Flesh firmness and fruit firmness

Though the first indicator was based on organoleptic assessment and the second one on instrumental measurements their ratings with the most of cultivars were quite similar. In the case of flesh firmness the highest score was given to Presenta. After Presenta and decreasing in rating were the cultivars Elena, Tophit, Valjevka and Topstar Plus. On the contrary the lowest score for firmness was given to Ruth Gerstetter, then to Anna Späth, Bluefre, Topfirst, Topgigant Plus and Oneida. In the penetrometer firmness analysis, highest values were mostly recorded in Presenta. After Presenta, cultivars Topstar Plus, Empress, Hanita and Valjevka followed in decreasing values. With regard to high variability among single measurements, however, differences in the mean values within these cultivars and also among some others were not statistically significant. The lowest values of the characteristic were again recorded in Ruth Gerstetter and Topfirst. Firmness in Topgigant Plus and Bluefre were not much higher.

Soluble solids

Cultivars Top 2000, Toptaste, Oneida, Topfive, Elena and Gabrovská displayed mean values of high soluble solids content. Similarly, like in the case of fruit firmness for reason of high variability among single measurements, however, differences within these cultivars or between some others were not significant. Ruth Gerstetter and Topfirst were significantly lower in content of soluble solids.

Total assessment of cultivars

From cultivars evaluated in this study Tophit was the most remarkable in practically all aspects. Trees were precocious and very productive, fruits large,

Table 4. Outside parameters of fruits and stones

Cultivar	Fruit						Stone	
	weight (g)			length (mm)	diameter (mm)	colour (1–9)	weight (g)	flesh adherence (1 to 9)
	mean	min.	max.					
Anna Späth	42.1	36.0	47.9	43.8	41.1	4.2	1.7	8.3
Bluefre	58.4	47.5	68.0	52.9	42.8	8.5	1.9	5.8
Elena	29.1	23.9	34.3	41.0	31.5	8.4	1.3	7.5
Empress	54.2	44.8	62.7	52.8	38.9	7.2	2.3	7.3
Gabrovská	25.6	22.3	30.3	39.5	31.9	8.0	1.4	8.0
Hanita	35.4	25.0	40.5	43.7	35.0	7.5	1.6	8.5
Jojo	42.8	36.1	48.5	47.8	37.9	7.2	2.0	8.1
Katinka	21.8	17.4	24.4	37.4	29.9	6.5	1.0	8.2
Oneida	47.9	40.6	59.2	48.7	42.3	7.0	1.8	7.1
Presenta	28.7	22.7	34.6	41.8	32.7	7.3	1.4	7.3
President	50.8	38.5	60.2	51.0	41.5	5.8	2.0	7.5
Ruth Gerstetter	29.2	27.2	33.2	38.7	33.6	5.4	1.6	8.5
Tegera	33.5	27.4	37.4	42.6	37.8	7.9	1.6	8.5
Top 2000	31.0	25.3	34.6	42.0	34.7	8.5	1.4	8.5
Topfirst	34.9	29.0	39.5	42.7	36.8	7.4	1.4	8.0
Topfive	27.6	25.4	29.8	38.0	34.2	8.3	1.2	8.5
Topgigant Plus	75.9	56.1	82.1	57.5	45.2	7.8	2.4	8.0
Tophit	53.0	40.5	62.3	52.1	41.7	8.3	2.1	8.5
Topper	35.7	29.6	39.8	43.0	34.5	7.8	1.5	8.5
Topstar Plus	45.4	36.8	50.1	48.7	40.0	8.0	1.5	7.9
Toptaste	36.1	31.1	40.6	42.4	38.2	8.3	1.9	8.0
Valjevka	28.3	22.2	37.1	41.3	34.3	8.4	1.5	8.5
Valor	48.4	39.4	63.4	47.8	40.2	7.2	1.7	7.4
Total mean	39.8	32.4	46.1	45.1	37.2	7.4	1.7	7.9
LSD (P = 0.05)	4.35			1.94	1.62	0.32	0.17	0.50

attractive and with very good parameters of fruit quality. Therefore it should be very welcome for enrichment of the dessert plum market in the Czech Republic. In addition it is also important to note that this cultivar considerably prolongs the plum ripening season beyond those presently grown in the country.

The next very interesting cultivar in this study was Presenta, which excelled in fruit quality, and in addition it also prolonged the harvest season of plums. It started, however, somewhat later into cropping and also its size of fruit was rather below average. Anoither cultivar with very good fruit quality was Hanita. Unfortunately it ripens at a time when the domestic market suffers from a surplus of plum production. The cultivar Jojo on the contrary would have much greater chance for practical growing because of its resistance to *Plum pox virus* despite that its inner fruit quality was rather under mean level. Fruits of the cultivar were quite attractive and with good size. Its greatest advantage, however, is its resistance to *Plum pox virus* (sharka). Therefore it has a great chance for extended use in amateur plum growing in this country that suffers a lot from the disease.

DISCUSSION

Tree vigour as a genetic characteristic may be influenced in the first years after by some other fac-

Table 5. Main characteristics of inner fruit quality

Cultivar	Taste	Flavour	Flesh firmness	Total quality	Soluble solids (%)	Fruit firmness (N)
Anna Späth	6.4	6.4	5.0	6.3	17.1	14.6
Bluefre	6.1	5.5	5.2	6.1	16.9	13.7
Elena	7.6	6.5	7.7	7.3	19.6	16.1
Empress	6.3	6.0	6.5	6.1	17.4	17.3
Gabrovská	7.2	6.2	6.9	7.0	19.4	16.4
Hanita	8.0	7.8	6.4	8.2	18.2	17.0
Jojo	6.0	5.9	6.8	6.1	19.0	16.1
Katinka	6.9	6.4	6.2	6.5	15.9	14.5
Oneida	6.3	5.8	5.8	6.5	20.1	15.9
Presenta	7.8	7.7	8.1	8.0	19.3	19.0
President	6.1	5.7	6.8	6.4	16.7	16.1
Ruth Gerstetter	5.3	4.8	4.8	5.2	13.6	12.7
Tegera	7.4	6.1	6.2	7.2	16.0	15.3
Top 2000	6.6	5.8	5.9	6.0	20.7	15.7
Topfirst	5.4	5.0	5.3	6.2	14.2	12.8
Topfive	6.9	6.2	6.3	7.0	19.7	14.8
Topgigant Plus	5.5	5.5	5.4	5.6	16.8	13.1
Tophit	7.9	6.9	7.4	8.2	18.9	16.0
Topper	6.7	6.4	6.6	6.7	18.4	14.6
Topstar Plus	6.8	5.6	7.1	6.0	18.2	17.9
Toptaste	7.7	7.4	6.7	7.5	20.5	15.9
Valjevka	7.3	7.5	7.4	7.5	18.5	16.6
Valor	6.1	5.6	5.9	5.8	18.2	15.2
Total mean	6.7	6.2	6.3	6.7	18.0	15.5
LSD (P = 0.05)	0.36	0.53	0.65	0.44	1.27	1.61

tors as quality of nursery stock, particular requirements of the cultivar for tree training, level of yields (precocity) etc. Therefore exact description of cultivars in this aspect requires a much longer monitoring period in several respective locations for a valid comparison of results. Tree vigour of cultivars that were repeatedly included into this new trial mostly agreed with our previous observations, except Empress, that grew more vigorously this time despite higher cropping (Blažek et al. 2004). Differences in tree vigour in the majority of tested cultivars confirm data from Germany (Hartmann, Fischer 2003; Stehr 2003) except Tophit growing vigorously and on the opposite President that did not grow very strong here. In the later case it was probably due to high cropping of the cultivar in our trial. Similarly Tegera grew vigorously in our trial, but was reported as slow growing in Bulgaria (Dinkova et al. 2007).

Mean yields and yield efficiency in this trial were on similar levels at our first trial (Blažek et al. 2005). Also span of these characteristics within evaluated cultivars had a similar pattern. Regarding cultivar Bluefre, it was somewhat less productive and Empress more productive in the present trial. High productivity of Tophit and Katinka contrasts with some results from Germany (Stehr 2003; Kickenweiz, Wurm 2005). Yield levels recorded in the majority of evaluated cultivars also corresponds quite well with data collected in Poland (Grzyb, Rozpara 2000). Greater discrepancy from results of recent testing in Poland was only in Hanita, where it was reported as

being very productive there (Rozpara, Grzyb 2007). Canadian cultivar Valor that was quite productive in our trial was reported as being less productive in the original country (Warner, Tehrani 1998).

The sequence of fruit ripening in the evaluated cultivars mostly agrees with published results (Jacob 2002a,b; Stehr 2003; Grzyb 2007). Some slight discrepancy in this respect could be explained by influence of different climatic conditions, the rootstock used or differences in fruit set. Greater discrepancy of our results with published data is only in the case of Oneida, ripening approximately 2 weeks earlier in Hungary (Surányi 2006).

Length of optimum harvest period besides uniformity of fruit ripening considerably depended upon the degree of fruit set (yield efficiency).

Mean fruit size and its variation recorded in this trial corresponded quite well to data observed in literature (Hartmann, Fischer 2003; Nenadović-Mratinić et al. 2007), although the mean fruit weight was generally a little smaller. This could be explained by intensive tree shaping in this trial leading to higher yield efficiency in a majority of cultivars. A greater disagreement in comparison to published data could be stated only in Empress that should have possessed very large fruits, sometimes reaching weights up to 100 g (Grzyb, Rozpara 2000). High content of soluble solids in fruits of Gabrovská has been reported before Vitanova et al. (2007).

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Předběžné výsledky hodnocení nových odrůd slivoní v husté výsadbě

ABSTRAKT: Šestnáct nových odrůd slivoní většinou pocházejících ze šlechtitelských programů v Německu bylo společně s několika standardními kultivary hodnoceno v husté pokusné výsadbě, založené v Holovousích na jaře roku 2004 ve sponu 5 × 1,5 m. Stromy naštěpované na podnoži St. Julian A byly pěstovány ve tvaru vřeten. U odrůd byly sledovány následující charakteristiky: vzrůstnost stromů měřená na základě plochy průřezu kmene a objemu korun, jejich výnosy, doba kvetení a doba zrání plodů a základní parametry určující kvalitu plodů. Nejvyšší výnosy a včasný vstup do období plodnosti byly zaznamenány u odrůd Tophit, Jojo, Elena a President, zatímco nejméně úrodné byly Ruth Gerstetter, Anna Späth a Topgigant Plus. Nejvyšší hodnoty specifické plodnosti stromů byly zjištěny u odrůd Katinka, Jojo, Topper a Empress, kdežto u odrůd Topgigant Plus a Anna Späth byly tyto hodnoty nejnižší. U všech hodnocených odrůd jsou dále uvedeny průměrné začátky doby zrání a průměrné délky sklizňového období. Největší průměrnou velikost plodů měla odrůda Topgigant Plus (75,9 g), za kterou v sestupném pořadí následovaly Bluefre, Empress a Tophit. Naproti tomu nejmenšími plody se vyznačovaly odrůdy Katinka, Gabrovská a Valjevka. Nejvyšší hodnoty bonitace kvality plodů dostaly odrůdy Hanita, Tophit a Presenta. Z hlediska sledovaných znaků se jako nejpozoruhodnější projevila odrůda Tophit, která navíc zraje v době prodlužující sklizňovou sezonu komerčně pěstovaných odrůd v České republice, určených pro konzum čerstvých plodů.

Klíčová slova: slivoň; odrůdy; vzrůstnost stromů; doba zrání; výnosy; velikost plodů; kvalita plodů

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