

COMPORTAREA UNOR SOIURI DE PRUN ÎN CONDIȚIILE ZONELOR DE CULTURĂ PLOVDIV SI PITESTI BEHAVIOUR OF SOME PLUM CULTIVARS IN PLOVDIV AND PITESTI AREAS

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Abstract

The studies were carried out, comparative, both in the plum collections of the Fruit Growing Institute Plovdiv - Bulgaria and Research Institute for Fruit Growing Pitesti - Romania, with 4 plum cultivars of different origin: 'Tuleu timpuriu' (Romania), 'Cacanska Lepotica' and 'Cacanska Najbolja' (Serbia) and 'Stanley' - control (USA). In the period 2002 - 2008 were carried out observations and determinations of: blooming and ripening times, production capacity, quality of fruit and response of plum cultivars to Plum pox virus. Varieties in both areas were noted by large fruit and superior comparative with quality control variety Stanley. In terms of yield capacity none of the 3 varieties did not exceed the control ('Stanley' cv.), in any of the two areas of culture. In Plovdiv - Bulgaria, period of blooming and ripening, of the studied varieties was earlier than in Pitesti - Romania. It should be noted that 'Tuleu timpuriu' Romanian variety gave better results in Plovdiv than in Pitesti.

Cuvinte cheie: *Prunus domestica* L., producție, calitate, înflorire, maturare,

Keywords: *Prunus domestica* L., yield, quality, blooming, ripening, PPV.

1. Introduction

The plum species holds the first place in the fruit patrimony of Bulgaria and Romania both as acreage and fruit production.

In Bulgaria the plum acreage in 2008 was 4,604 ha representing 20.95% of the total fruit growing area and the fruit production in the same year was 14,298 tons – 20% respectively of the total fruit production. The major varieties grown in the commercial orchards are: 'Stanley' (70.13%), 'Gabrovska' (4.15%), 'Cacanska Lepotica' (1.31%), 'Cacanska Najbolja' (0.54%) (Bozhkova, 2006, FAO data, 2009).

In Romania, according to FAO data (2009), the plum acreage was 76,225 ha, representing 48.94% of the total fruit growing area, 12.57% respectively of the plum acreage in Europe. The plum production is going down, so in 2007 only 372,631 tons were obtained (35.52%) of the total fruit production, 28.46% respectively of the plum production in Europe, so Romania holds the second place after Serbia. The plum assortment includes the following varieties: 'Stanley' (40%), 'Anna Spath' (40%), 'Centenar' (10%), 'Agent' (5%), 'Tuleu gras' (5%). (FAO data, 2009; Butac, 2006, Cociu et al., 1997).

Having in view the importance of plum culture in the two countries, we have done a comparative study in the plum collections from the Fruit Growing Institute Plovdiv – Bulgaria and Research Institute for Fruit Growing Pitesti – Romania, selecting 4 plum varieties of various origin: 'Tuleu timpuriu' (Romania), 'Cacanska Lepotica' and 'Cacanska Najbolja' (Serbia) and 'Stanley' – Mt. (USA).

2. Material and methods

The studies were performed over a six year period (2002 – 2008) in the plum collections of Fruit Growing Institute Plovdiv – Bulgaria and Research Institute for Fruit Growing Pitesti – Romania utilizing 4 plum cvs. Of various origins: 'Tuleu timpuriu' (Romania), 'Cacanska Lepotica' and 'Cacanska Najbolja' (Serbia) and 'Stanley' – Mt. (USA). The two collections own 170 accessions in Plovdiv and 550 accessions in Pitesti.

The estimation of blooming and fruiting phenophases was done according to Fleckinger's method of reference stages. (Fleckinger, 1960; Chapman et al., 1976)

The quantification of the yield potential was done by weighing the production per each tree (kg/tree) at the optimum harvesting time.

The fruit weight (g) was evaluated by weighing a mean sample of 25 fruit.

The soluble dry weight of fruit was determined by means of a portable digital refractometer (Brix %) at the optimum marketing time.

The response of the plum varieties to PPV was valued on a rating scale used in the investigations of the Plant Protection Lab.: (-) 1 – no attack; (+) 2 – slightly attack; (+) 3 – mid attack; (+) 4 – severe attack (Isac et al., 2002, Butac et al., 2009).

The climatic conditions of the two zones are favourable to the plum culture; so the mean annual temperature in Plovdiv is 12.3°C and in Pitesti is 9.7°C; the annual rainfalls in Plovdiv reach 540 mm and in Pitesti 663 mm.

3. Results and discussion

The average beginning of blooming time in Plovdiv was the 1st decade of April while in Pitesti was the 2nd decade of April. The earliest blooming start in Plovdiv showed the varieties: 'Cacanska Lepotica' and 'Tuleu timpuriu', and in Pitesti, 'Cacanska Lepotica' and 'Cacanska Najbolja'. In Romania, 'Tuleu timpuriu' is a late blooming cv. while in Bulgaria it has an early blooming time. The late blooming cultivars are particularly important for the fruit growing and breeding as well as because they have a lower risk to be damaged by the spring late frosts, phenomena lately present in both countries. (Fig. 1)

Regarding the ripening season of these plum cvs., one can see that in Bulgaria it was 4 – 5 days earlier than in Romania, but for 'Tuleu timpuriu' cv. two weeks earlier. (Fig. 2)

The evaluation of these plum cvs. as concern the fruit production has shown a lower yield of the 3 cvs. versus the control cv., 'Stanley'. In both locations, the mostly productive varieties proved to be 'Cacanska Lepotica' and 'Cacanska Najbolja'. 'Tuleu timpuriu' cv. gave a very good yield in Bulgaria but a very low one in Romania. (Fig. 3)

The fruit quality of all studied cultivars was superior to the control, 'Stanley' in both places. Thus, 'Cacanska Najbolja' and 'Tuleu timpuriu' were distinguished by very big fruit (over 50 g), and 'Cacanska Najbolja' and 'Cacanska Lepotica' by a high content of soluble dry weight (over 18%). (Fig. 4, 5)

The major physical properties of the fruit were also investigated: fruit shape, skin and flesh colour as well as stone adherence. It was observed that these cultivars have fruit of various shapes with an even and regular contour, all appreciated by the consumers. The skin colour is blue in all 4 varieties and the flesh is regularly coloured, interfering us other colors (greenish in the control and yellowish in the other 3 varieties. Mostly of the studied of cvs., were stone non-adherent. (Table 1)

The major concern in plum breeding worldwide and also in our country is the resistance or tolerance to virus diseases, particularly to PPV, which is very hazardous for this species. The spreading percentage of this disease is very high, 20 – 45, closely related to the variety, vector and infection source.

Studying the cultivars response to PPV, none showed PPV tolerance, most of them showing a slighter attack versus the control. As a conclusion to that aspect, there is not always a positive correlation between the symptoms on leaves and fruit of the same cultivar, but the most severe damage is rather on leaves than fruit (Table 2).

5. Conclusions

1. In both zones, the cultivars produced large fruit of better quality than the control cv., 'Stanley'.
2. Regarding the production potential the 3 cvs. did not exceed the control in none of the two growing areas.
3. In Plovdiv – Bulgaria, the blooming and ripening seasons were earlier than in Pitesti – Romania.
4. It should be stressed that the Romanian cv., 'Tuleu timpuriu' gave better results in Plovdiv than in Pitesti.

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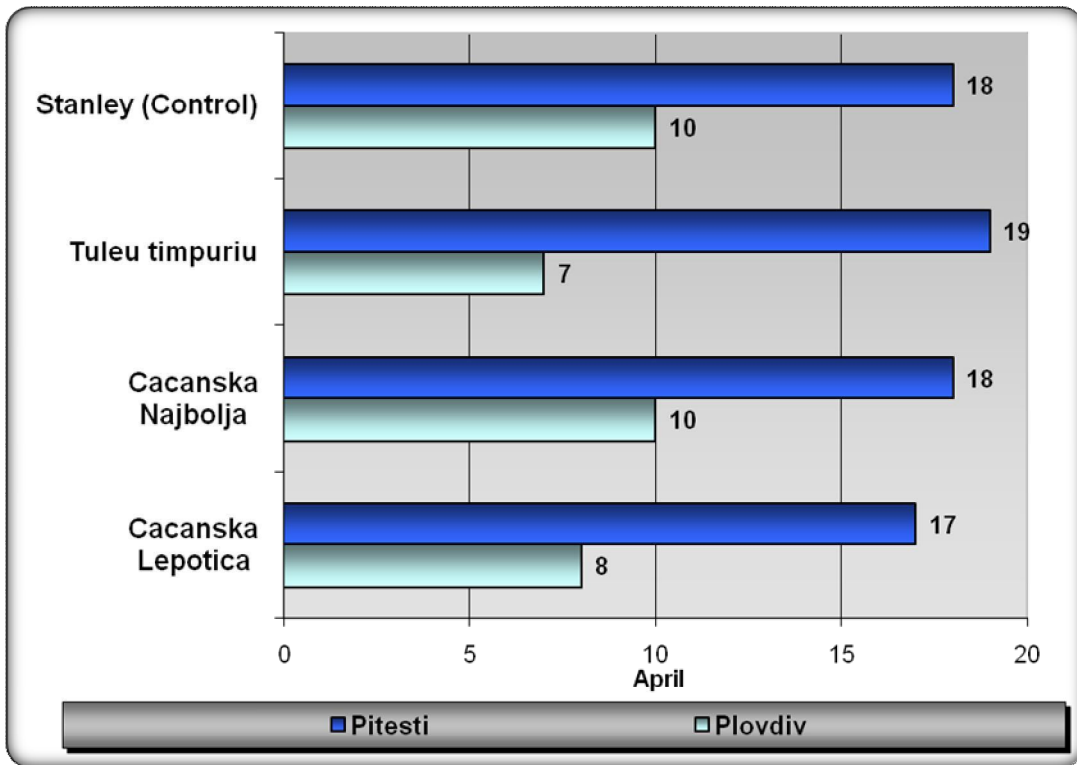


Fig. 1. The beginning of blooming period under study in the two locations (2002-2008)

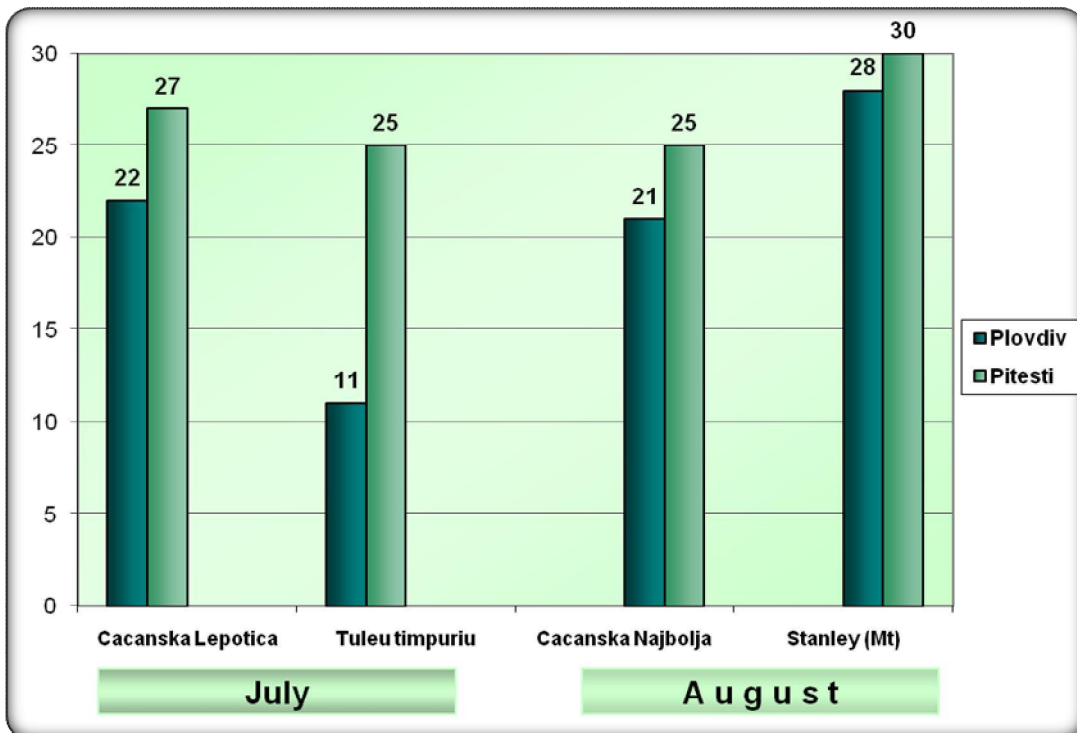


Fig. 2. Harvesting season of the plum cvs. under study in the two locations (2002-2008)

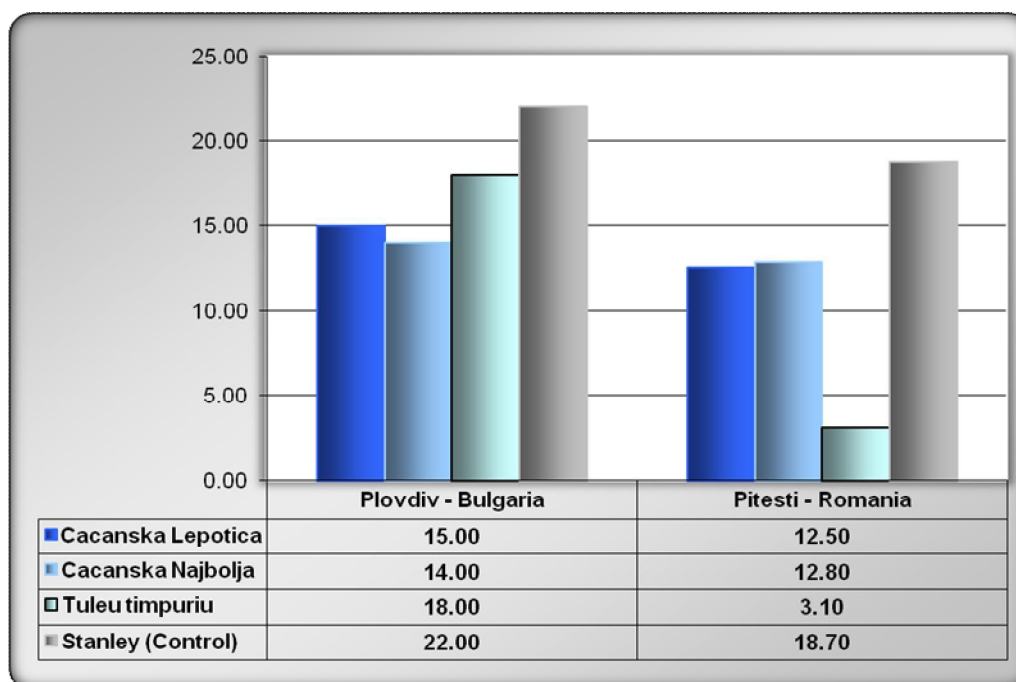


Fig. 3. Fruit yield of the plum cvs. under study in the two locations (2002-2008)

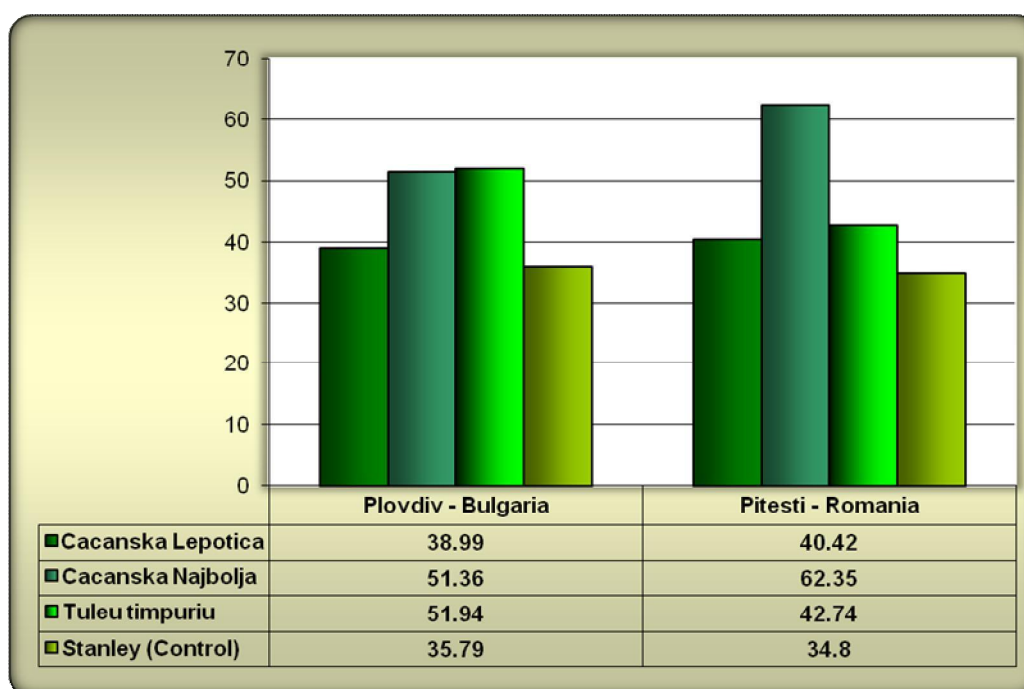


Fig. 4. Mean fruit weight of the plum cvs. under study in the two locations

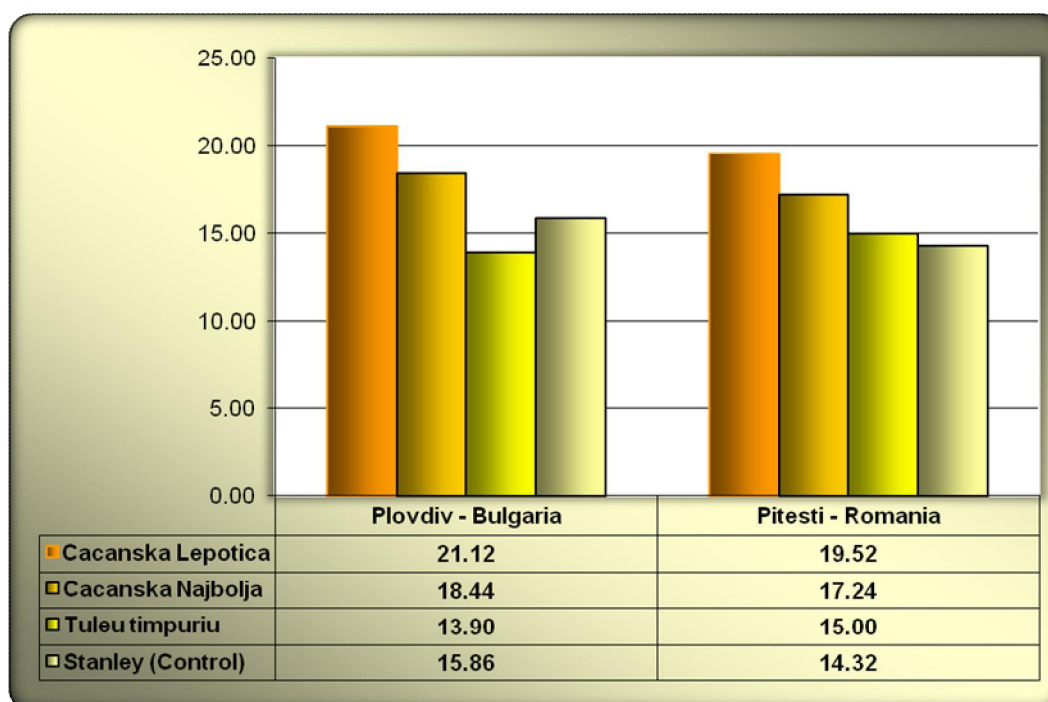


Fig. 5. Mean content of soluble dry weight of the plum cvs. under study in the two locations

Table 1. Major physical features of cultivars fruit under study

| No. | Cultivar | Fruit shape | Fruit colour | Flesh colour | Stone adherence |
|-----|-------------------|----------------------------|--------------|----------------------|-----------------|
| 1 | Cacanska Lepotica | Ovoid | Blue | Yellowish | Freestone |
| 2 | Cacanska Najbolja | Spherical oval, asymmetric | Blue | Greenish - yellowish | Freestone |
| 3 | Tuleu timpuriu | Ellipsoidal | Blue | Yellowish | Semi clingstone |
| 4 | Stanley (Control) | Ellipsoidal | Dark blue | Greenish | Semi clingstone |

Table 2. Response of studied cultivars to Plum Pox Virus

| No. | Cultivar | Plum Pox Virus | |
|-----|-------------------|----------------|----------|
| | | On leaves | On fruit |
| 1 | Cacanska Lepotica | 2 | 2 |
| 2 | Cacanska Najbolja | 3 | 1 |
| 3 | Tuleu timpuriu | 2 | 1 |
| 4 | Stanley (Control) | 4 | 2 |

PPV: 1 (-) – no attack; 2 (+) – slightly attack; 3 (+) – mid attack; 4 (+) – severe attack.



**PPV symptoms on leaves and fruit of the cultivars
'Cacanska Lepotica'**

'Cacanska Najbolja'



PPV symptoms on leaves and fruit of 'Tuleu timpuriu' cv.