

RESEARCH ON THE GERMPLASM OF *PRUNUS ARMENIACA* L. AT THE REGIONAL CENTRE FOR APPLIED SCIENCE, SILISTRA, BULGARIA

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Abstract. The selection of individuals adaptable to environment and with high fruit quality in the case of apricot-trees is the main aim presented in this paper. The study of the rich genetic resources (3600 of seedlings) created in the Regional Centre of Applied Science - Silistra, Bulgaria, allows us to enrich the genetic fund of that plant species. By primary estimation of 1217 apricot seedlings are selected apricot elites that are studied through comparative assay with reference cultivars. The next step of the selection cycle will be the official registration of the elites for commercial aim by the State Variety Committee and a forthcoming dissemination.

Key words: *Prunus armeniaca* L., elites, phenology, dormancy, productivity

INTRODUCTION

The breeding activity on apricot culture in Apricot Research Station, Silistra has started since 1953 when it was established. There were bred and selected 9 new apricot cultivars, which are today most widespread into the country, they are: Silistrenska kompotna, Boryana, Roxana, Gergana, Silistra 252, Albena, Dryanovska kusna, Rjahovska and Festivalna.

Since 1989 it has started a creation of a new apricot genetic fund through of crossings between local and foreign cultivars with main goal for improvement and enrichment of genetic resources in apricot. It was finished primary examination with 1217 seedlings (Coneva, 2000). Currently, these activities continue with comparative assay of selected individuals and reference cultivars. The main aim of our research work is study of agronomic traits in elites to find out those of them with combination of desirable properties as adaptability, good fruit quality, productivity etc.

MATERIALS AND METHODS

The research is carried out in field conditions, where the plants are planted. The trees grow under condition without irrigation, cultivation of the soil for weed control and limited treatments against pathogens. The Hungarian best cultivar is used as reference.

For estimation of agronomic traits are used two sources - Apricot Descriptors and Method for investigation of plant resources in fruit species (3, 5). Following traits are included: chilling requirements, susceptibility to low temperature, season of flowering, cropping efficiency, season of ripening and fruit quality.

RESULTS AND DISCUSSION

1. Chilling requirements: Investigation on chilling requirements was made in 24 apricot elites. During the period of study all the trees finished the dormancy in January. The control cultivar Hungarian best came out of dormancy on 13 January in 2004. According to the Apricot Descriptors the Hungarian best cv. has intermediate chilling requirements. 11 elites finished the dormancy on 13 January as well. The rest of them came out on 16th of January. Only one (VIII.66.90) was ready for starting vegetation on 10 of January. In 2005 the results obtained were different than previous year.

There are pointed out in literature data for the strong impact of number of factors which influence to this trait like, temperature of the air, physiological state, genetic determination, geographic origin (4, 6, 7, 8).

Our observations in this respect confirm that despite yearly variation of the end of dormancy, the order of finishing the dormant period is keep unchanged (Vachun et. al., 1984). According to results and previous investigations (Conev, 1991), it was find out that there is no high correlation between duration of dormant period and cold resistance. We classified the selections in the following groups:

Low - VIII.70.90, VIII.68.90, VII.1.90, VIII.14.90, VIII.29.90;

Intermediate - Hungarian best, VIII.66.90, VIII.24.90, VIII.43.90, VII.26.90, VI.2.87, VIII.8.90;

High - V.3.87, III.3.87, VIII.1.90, III.27.90, I.11.87, VII.12.90, VII.19.90, VIII.10.90, V.16.87, VIII.11.90, V.12.87, V.18.87, I.32.87, Silistra 252.

2. Susceptibility to low temperature: The results proved that apricot elites are resistant to low temperatures in winter, but they suffer more by spring frosts, which often occur in this area. Concerning the resistance to cold of the elites we are selected the following individuals: I.11.87, VIII.43.90, VIII.1.90, VIII.10.90, III.27.90, I.32.90, VII.1.90, V.12.87, VII.19.90, X.59.92, XVI.20.93, XXIX.32.95, XXVIII.38.93, XIV.23.93, XII.82.93, XII.101.93, IX.19.92.

More often the trees are damaged by spring frosts. The observations were made at the stage H (fruit size of 1 cm). The lowest percent of damages had the following elites: VIII.11.90, VIII.10.90, VIII.14.90, VIII.43.90, VII.12.90, III.27.90, III.3.87, VIII.1.90.

Susceptibility of apricot trees to low temperature depends mainly on the stage of developing (Nyujto, 1985). The reference cultivar Hungarian best is defined as moderately resistant to spring frost.

3. Season of flowering: Usually time of flowering in apricot concern the resistance of trees to early spring frost. Many breeding programs pointed out that selection of individuals to this trait is most important. According to Apricot Descriptors the beginning of flowering is when 10 % of flowers are open. On this base we are observed 24 apricot elites and 136 seedlings. The diagram 1 (Figure 1) shows the order of beginning of bloom. Most of the seedlings (123 of them) posses late bloom.

4. Cropping efficiency: This trait has varied over the years. Different impacts influent on the productivity and yields as: agricultural practices, damages by diseases, damages by low temperatures. Due to the mentioned impacts, was made an assay of productivity through examination marks (1-9). The trees were observed at the stage of growing fruits, after natural dropping. The plants were distributed in the following groups:

Cropping poorly - V.18.87, V.12.87, V.3.87, VI.2.87, I.11.87, VIII.66.90, VIII.70.90, VIII.10.90, VIII.14.90, VIII.24.90, I.32.90, III.27.90.

Cropping intermediate - V.16.87, III.3.87, VIII.68.90, VIII.11.90, VII.1.90, VIII.29.90, VII.26.90, VII.12.90, VIII.8.90.
 Cropping well - VII.19.90, VIII.43.90.

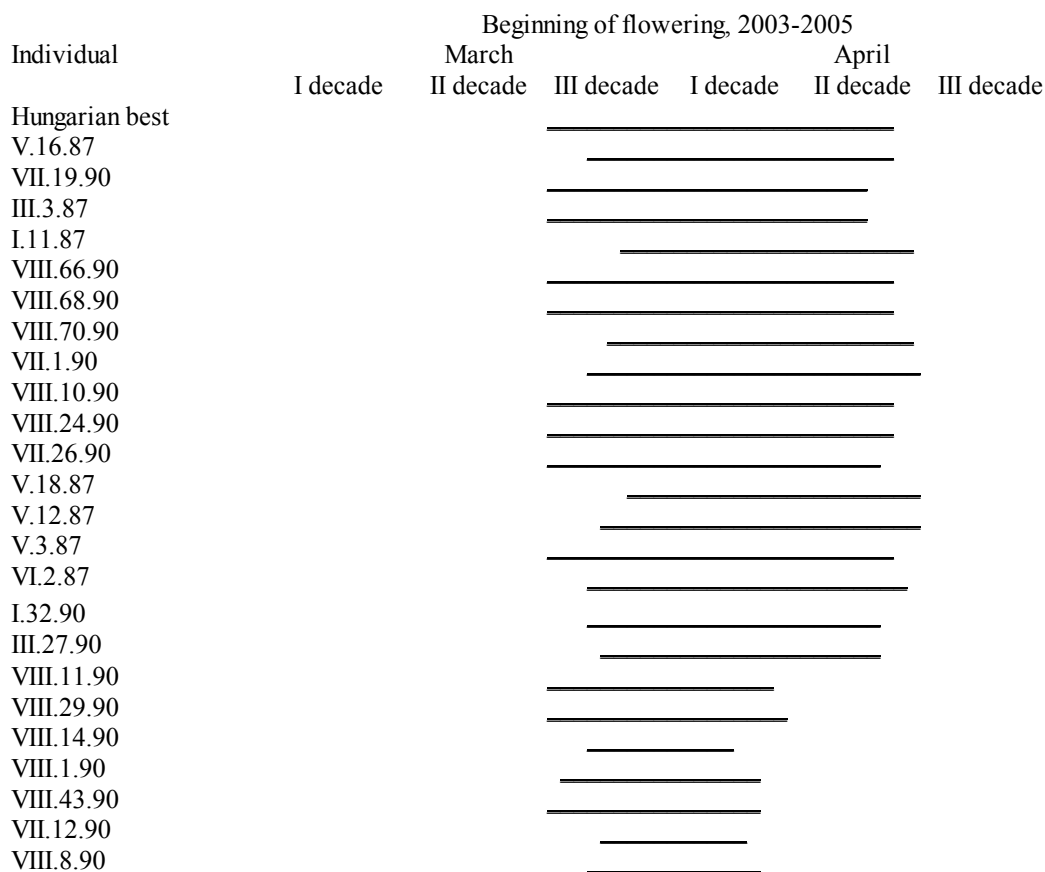


Figure 1. The flowering period of apricot elites, 2003-2005

5. Season of ripening: Diagram 2 (Figure 2) shows the time of ripening of apricot elites. This trait has an importance for prolongation of supplying to markets with fresh fruits. The individuals are divided into five groups according to this trait:

Very early ripening - VII.1.90, VIII.43.90, XXXI.78, XXXI.79, XXXI.82, XXXI.2

Early ripening - VIII.70.90, VII.12.90, VIII.68.90, VIII.10.90, IX.19.92, XII.101.93, XII.82.93, XXVII.72.93, XVIII.38.93, XXVIII.38.93, XXXIII.14, XXX.92, XXXII.92, XXI.7, XIV.99, XXXI.76

Intermediate ripening - VIII.24.90, VIII.20.90, V.3.87, VIII.69.90, VIII.29.90, VIII.1.90, VII.26.90, VIII.11.90, VIII.17.90, XXX.42, XXXI.68, XXXII.68, XXXIII.68, XIV.23.93, XVIII.15.93

Intermediate/late - III.3.87, V.18.87, VI.2.87, V.16.87, VII.19.90, V.12.87, VIII.8.90, X.59.92

Late - III.27.90, XIV.5

Despite differences in time of ripening over the years ripening of elites is kept because this trait is genetic controlled. Besides that according to Conev (1991), time and duration of ripening correlated positively with fruit bearing of trees.

Season of ripening

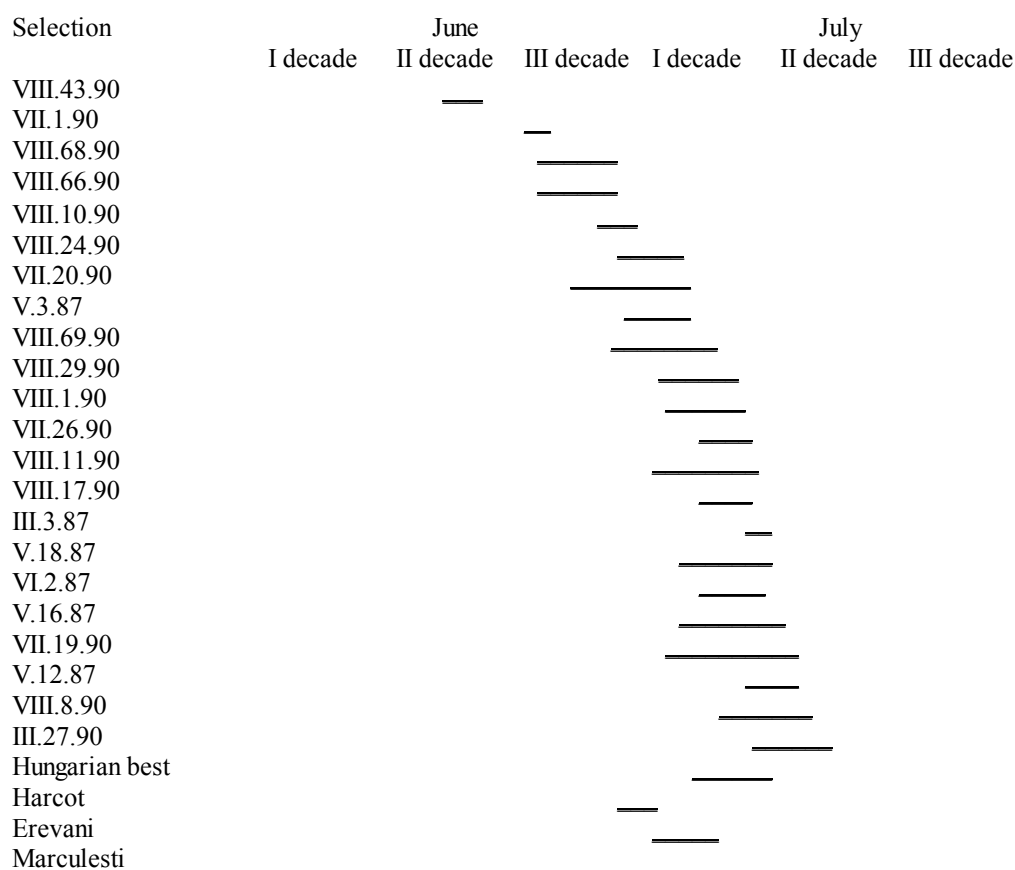


Figure 2. The season of ripening of apricot elites, 2003-2005

6. Fruit quality: To determine this character there were used the following properties: attractiveness, weight, shape, colouring, texture of flesh, eating quality and aroma. The elites that are of interest combining useful properties are:

VII.19.90 - large fruits, fine texture of flesh, good flavour, good aroma

III.3.87 - good attractiveness, fine texture of flesh, good flavour, rich aroma

VIII.66.90 - good flavour, fine texture of flesh, good aroma

VIII.70.90 - large fruits, good attractiveness, good flavour, good aroma

V.18.87 - large fruits, fine texture of flesh, good flavour, good aroma

VII.12.90 - good attractiveness, fine texture of flesh, good flavour and aroma

VIII.14.90 - large fruits, good attractiveness, fine texture of flesh, good flavour and aroma

VII.20.90 - good flavour, rich aroma

XII.82.93 - good attractiveness, good flavour, rich aroma

XIV.23.93 - good attractiveness, fine texture of flesh, good flavour, rich aroma

X.59.92 - fine texture of flesh, good flavour and aroma

XXXII.92 - good attractiveness, large fruits

XXXII.64 - good attractiveness, good flavour

XXXI.74 - god attractiveness, good flavour and aroma, super fine texture of flesh

XXXIII.12 - good flavour, fine texture of flesh, good aroma.

CONCLUSIONS

The success in cultivation of apricot culture depends on the adaptability to different places. The correctly chosen cultivar suitable to soil type, rootstock compatibility and environment is the key factor for regular yields with good quality of fruits. It is not sufficient to bear in mind only the phenotypic characters of cultivar, but the link of phenotype, genotype and environment. It is needed to discover the strong relation between genotype and environment for better understanding of cultivar behaviour.

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REZUMAT

CERCETĂRI PRIVIND GERMOPLASMA EXISTENTĂ LA *PRUNUS ARMENIACA* L. LA CENTRUL REGIONAL DE ȘTIINȚE APLICATE DE LA SILISTRA, BULGARIA

Selecția individuală efectuată pentru adaptarea la mediu și pentru o foarte bună calitate a fructelor constituie o metodă de bază folosită în ameliorare pentru exploatarea variabilității creată prin hibridare. Studiile fondului de genotipuri reprezentat de numeroșii hibrizi pe rădăcini proprii creați la Centrul Regional de Științe Aplicate de la Silistra, Bulgaria, a permis îmbogățirea sortimentului la cais cu nouă soiuri create de la înființarea Centrului (1953), acestea fiind foarte răspândite în prezent în cultură în Bulgaria. După o estimare primară a unui număr de 1.217 hibrizi de cais au fost selecționate mai multe elite care au fost testate în culturi comparative alături de soiuri martor de referință. Pasul următor al ciclului de selecție îl va constitui înregistrarea oficială a elitelor care se dovedesc foarte valoroase prin prisma adaptabilității și calității producției, înscrierea lor în Catalogul Oficial și introducerea în cultură.