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CERCETĂRI FENOLOGICE ÎN DEZVOLTAREA PLANTELOR DE AFIN ÎN REPUBLICA MOLDOVA

PHENOLOGICAL RESEARCH IN THE DEVELOPMENT OF BLUEBERRY PLANTS IN THE REPUBLIC OF MOLDOVA

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Abstract

The paper presents research results and observations made on the development of phenological phases during 2016-2018on the blueberry varieties studied in the Republic of Moldova. The studied blueberry varieties were: Blueray, Early Blue, Azur and Lax. It was established that in blueberry varieties under study unfolding takes place in the period from 09.03 until 29.03. Duration of unfolding and bloom varies between 34-38 days. Flowering lasts from 12 to 19 days during the period from 13.05 until 21.05. Fruit maturation occurs 60-69 days after the start of flowering in the period from 15.06 until 26.08. The length of the blueberry ripening period is 42 - 50 days. For varieties studied, the period from the beginning of the vegetation to the maturation of fruit varies between 104 and 114 days.

Cuvinte cheie: afin, soiuri, fenofaze, Republica Moldova.
Key words: blueberry, varieties, phenophases, Republic of Moldova.

1. Introduction

Blueberries are a relatively new species in the world. In blueberry culture, most varieties were created in the US. At present, it has a wide spread on all continents and European countries such as Germany, Poland and Romania, etc. (Bădescu, 2008; Grădinariu, et al., 2009). Blueberry is a 1-3 m high shrub, and the bush is made up of a number of different strains of approximately equal thickness. Blueberries grow on acidic soils, unsuitable for other crops and can be used to combat soil erosion. The productive potential of the blueberry is about 3 to 5 kg of a 6 to 8 year old bush, which corresponds to 3-4.5 t/ha, and the average duration of the plantation is 20 - 40 years (Bădescu, 2008; Chira, 2000; Mladin, et al., 1992). For blueberries it is specific that fruit buds start in vegetation before vegetative shoots with 1-2 weeks depending on the variety. The blooming takes place after the late spring frosts, the inflorescences evolves from the bottom to the top, so that at some point we meet on clusters growing fruit and open or opening flowers. In the same order, fruit maturation takes place, whose harvesting is done in 4-6 rounds, depending on the variety and the temperature course (Mladin, et al.,1992). Blueberry blooms later, after the leaves appear, in May and lasts 20-30 days. Flowers are grouped by 6-20 (more often 7-8) in racemes, which open gradually, starting from the base of the inflorescence to the top. Blooming takes 20-25 days. Fruits reach maturity in phases after 48-55 days from the end of blooming (July).Their ripening is staggered, the ones obtained during the first harvesting being bigger and richer in seeds, but which do not influence their taste (Andronic, 2017; Chira, 2000).

2. Material and methods

The collection of blueberry varieties was established in 2010. The researches were carried out on the experimental sector of the "Small Fruits and Strawberry" laboratory of the Codru Experimental Technological Station within IP IŞPHTA. As study subjects, were taken blueberry varieties: Blueray, Early Blue, Azur and Lax. The blueberry was planted in buckets with acid substrate. The study was carried out using the methods (Cociu et Oprea, 1989) both in the field and in the laboratory according to the planned and established schedule for fruit shrubs.

3. Results and discussions

The introduction into the Country of blueberry varieties allowed their study, and its precious fruits have begun to be known and appreciated in the Republic of Moldova, being asked by both producers and consumers (Sava, 2015).

During the years 2016 - 2017, observations were made on the phenological stages of plant development in blueberry species. The investigations were based on the monitoring of phenological, biometric indicators.

In all varieties studied during the research period, no frostbite of plants was observed due to the favorable climatic conditions during winter. There were also no symptoms of disease and pest attack, which allowed exclusion of chemical treatments.

The results of the observations made during the phenological phases of the blueberries are included in Table 1.

According to the data from Table 1, during the researches it was established that the unfolding starts between 09.03 - 29.03, but the phenological flowering phase depends on the climatic conditions established in the given period, on the capacities of the studied varieties and varies between the dates 13.04 - 04.05 and the end of the flowering until 21.05.The duration of the flowering period varies from 12 to 19 days, fruit ripening takes place over 60-69 days from flowering. For varieties studied, the period from the beginning of the vegetation to the fruits ripening varies between 104 and 114 days.

It can be mentioned that under the climatic conditions of the vegetation period of 2017, the development phenological phases of blueberry plants (Fig.1, Fig.2) started later in comparison with 2016.As a result of the observations on the phenological phases in the blueberry varieties, it was established that the general condition of the plants was satisfactory, the plants showed a good development of the foliar system.

In 2016, the varieties Early Blue and Blueray have recorded 100% fruits set on 16.05, and the varieties Azur and Lax on 20.05.In 2017, Early Blue and Blueray varieties recorded 100% fruit set on 01.06, and Azur and Lax varieties on 07.06.In 2018 the Early Blue and Blueray varieties registered 100% fruit set on June 25, and the Azur and Lax varieties on 01.06.

4. Conclusions

As a result of the researches carried out on the adaptability of the blueberry varieties to the climatic conditions of the Republic of Moldova, it was found that:

- For all of blueberries varieties taken into the study were not observed frostbite of plants, no symptoms of disease and pest attack, which helped to avoid application of chemical treatments;
- Depending on the genotype of the blueberry variety, the unfolding, blooming and maturing phases take place differently.
- From the data we can see that the development of the plants in the year 2017 occurred 12-15 days later compared to 2016 and in 2018 earlier with 2-6 days.
- Developmental phenoashes of the varieties studied start when the buds start swelling and last until the autumn leaves fall, it is characterized by an active vital status, specific dynamics for growth and fructification organs.
- Each studied phenophase in the blueberry species is dynamically accompanied by certain morphological, anatomical, physiological, biochemical modifications, having as any dynamic process, beginning, maximal development and ending.
- The pedo-climatic conditions in the Republic of Moldova are generally favorable for the blueberry culture if the requirements of this species are respected in relation to ecological and technological factors, especially irrigation in drought periods.

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Tables and figures

Table 1.The phenological phases of the development of blueberry varieties

Variety name, year	Start of budding	Duration between phenophases	Blooming			Duration between phenophases	Ripening			
			Start	End	Duration of period		Start	End	Duration of period	Duration from the beginning of vegetation
Earlyblue										
2016	09.03	34	13.04	25.04	13	63	15.06	19.07	44	107
2017	20.03	36	26.04	11.05	16	63	27.06	13.08	47	106
2018	21.03	32	22.04	07.05	16	60	20.06	09.08	50	110
Average		**34**			**15**	**62**			**47**	**109**
Blueray										
2016	09.03	**35**	14.04	27.04	**13**	**64**	18.06	30.07	**42**	**106**
2017	20.03	**38**	28.04	14.05	**15**	**60**	30.06	16.08	**46**	**106**
2018	18.03	**36**	23.04	10.05	**17**	**64**	26.06	10.08	**45**	**109**
Average		**36**			**15**	**63**			**44**	**107**
Azur										
2016	11.03	**37**	18.04	30.04	**12**	**63**	20.06	31.07	**41**	**104**
2017	23.03	**38**	01.05	18.05	**17**	**66**	06.07	21.08	**46**	**106**
2018	20.03	**34**	23.04	12.05	**19**	**69**	01.07	17.08	**46**	**105**
Average		**36**			**16**	**66**			**44**	**105**
Lax										
2016	15.03	**36**	21.04	03.05	**13**	**62**	21.06	05.08	**44**	**106**
2017	29.03	**36**	04.05	21.05	**17**	**68**	11.07	26.08	**46**	**114**
2018	26.03	**35**	30.04	18.05	**18**	**60**	07.07	21.08	**45**	**104**
Average		**36**			**16**	**63**			**45**	**108**
Average for variety		**35**			**15**	**63**			**45**	**107**

Figures

a) Blooming period

b) Ripening period

Fig. 1. Phenophases of blueberry plants development

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Fig. 2 . Ripped fruits of some studied blueberry varieties