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Study Of The Effect Of Micronutrients On The Timing Of Vegetation Phase Transitions Of Plum Varieties In The Climate Of Karakalpakstan

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Abstract: In this article, the influence of micronutrients on the timing of phenological phases of the "Raney Victoria" plum variety was studied. The timing of bud burst and shoot elongation, flowering, fruit ripening, and leaf fall phases, as well as the duration of the vegetation period of this variety, were determined. Treatment of the "Raney Victoria" variety with a boron solution (boric acid – H3BO3) at a concentration of 0.02 mg/l showed the best effect on the transition of phenological phases. It was also found that the duration of the vegetation period was shortened by 4-7 days compared to the control.

Keywords: The translation of the word, plum, variety, vegetation, phenological phase, micronutrient.

Introduction: Studying the progression of vegetative periods in plum varieties is an important process, where the timing of phenological phase transitions varies among varieties. This helps in selecting varieties that are suitable for different soil and climatic conditions.

Environmental factors and changes in adverse weather conditions negatively affect the progression of phenological phases in fruit and nut plants, leading to reduced yield and quality. The issues of stabilizing productivity and increasing the stress resistance of fruit crops are becoming increasingly urgent, with the role of nutrition by various micronutrients (Zn, Mn, Fe, B, Cu) being very important.

In plum varieties, nutrient deficiencies during phenological phase transitions cause shedding of flowers, fruits, and leaves, halt shoot growth, and weaken the root system. Nutrient deficiency in the

second half of summer leads to early fruit ripening, fruit drop, and decreased physiological activity.

The onset of the phenological phases in plants depends on heat accumulation and agro-technical measures, as well as the biological characteristics of the plants. Based on multi-year phenological observations, conducting variety trials is necessary to understand the adaptability of varieties' biological traits to the soil and climatic conditions of the region.

METHODOLOGY

The influence of micronutrients on the timing of phenological phases of the "Raney Victoria" plum variety was studied. The research was conducted in 2022-2024 at the Karakalpak Experimental Station of the Academician Mahmud Mirzaev Research Institute of Horticulture, Viticulture, and Winemaking.

The concentration of boric acid and zinc sulfate as micronutrients were used in the study. The aim of the research was to determine the effect of micronutrients on the timing of the vegetative phases of plum varieties. The "Raney Victoria" plum variety was selected as the research subject.

RESULTS

Changes in the duration of the vegetative period of plum varieties can also be observed when different doses of micronutrients are applied. To determine this, observations were conducted on the vegetative phase progression of plum varieties in a field experiment where various doses of micronutrients were applied.

In the experiment, the phenological phase progression of the "Raney Victoria" plum variety was analyzed. The results showed that when treated with boric acid at a concentration of 0.01 mg/l, bud swelling began on March 14th, and bud break

occurred 1-2 days earlier on March 22nd compared to the control. The flowering period started on March 28th and ended on April 8th, beginning 3 days earlier than the control. Fruit ripening started on June 10th and finished on July 9th, 5-7 days earlier than the control. Leaf fall was observed on October 26th, ending 3 days earlier than the control. The total duration of the vegetation period was 227 days.

When treated with boric acid at a concentration of 0.02 mg/l, bud swelling started on March 13, and bud break began 1-2 days earlier on March 23. The flowering period started on March 25 and ended on April 6, beginning 7-10 days earlier than the control. Fruit ripening started on June 7 and finished on July 7, ripening 7 days earlier. Leaf fall ended on October 20, 9 days earlier than the control. The duration of the vegetation period was 222 days, differing by 7 days compared to the control.

When boric acid was applied at a concentration of 0.03 mg/l, bud swelling was observed on March 14, and bud break occurred on March 21, starting 1-3 days earlier than the control. The flowering period began on March 26 and ended on

April 9, starting 2-5 days earlier than the control. Fruit ripening started on June 10 and ended on July 8, ripening 6-8 days earlier than the control. Leaf fall ended on October 24, finishing 5 days earlier than the control. The vegetation period lasted 225 days, finishing 4 days earlier than the control.

When zinc sulfate was applied at a concentration of 0.02 mg/l to the Raney Victoria variety, bud swelling was observed on March 15, and bud break started on March 22, beginning 2 days earlier. The flowering period started on March 30 and ended on April 12, finishing 1-2 days earlier than the control. Fruit ripening began on June 12, 5 days earlier, and ended on July 10, 4 days earlier than the control. Leaf fall ended on October 24, finishing 5 days earlier than the control. The vegetation period lasted 227 days, ending 2 days earlier than the control.

When zinc sulfate was applied at a concentration of

0.03 mg/l to the Raney Victoria variety, bud swelling was observed on March 14, and bud break started on March 23, beginning 1 day earlier than the control. The flowering period began on March 24, starting 7 days earlier than the control, and ended on April 7, finishing 1 day later. Fruit ripening started on June 9, 4 days earlier, and ended on July 5, 3 days earlier than the control. Leaf fall was observed on October 27, ending 4 days earlier than the control. The vegetation period lasted 226 days, ending 3 days earlier than the control.

The influence of micronutrients on the timing of phenological phase transitions in plum varieties (2023).

The translation of	Concentration, mg/L.	Bud swelling, day, month.	Bud break, day, month.	Flowering, day, month.		Ripening, day, month.		The timing of leaf color change, day,	Leaf fall, day, month		Vegetation duration, days
				Is beginning	completion.	beginning.	end		beginning.	end	
1	2	3	4	5	6	7	8	9	10	11	12
Plum variety Raney Victoria											
Water (control).	-	15/III	24/III	31/III	11/IV	17/VI	14/ VII	26/IX	20/X	29/ X	229
B (boric acid) - H3BO3.	0,01	14/III	22/III	28/III	8/IV	10/VI	9/ VII	25/IX	18/X	26/ X	227
	0,02	13/III	23/III	25/III	6/IV	7/VI	7/ VII	23/IX	19/X	20/ X	222
	0,03	14/III	21/III	26/III	9/IV	10/VI	8/ VII	24/IX	17/X	24/ X	225
Zn (zinc sulfate - ZnSO4).	0,02	12/III	22/III	30/III	9/IV	12/VI	10/ VII	25/IX	16/X	24/ X	227
	0,03	14/III	23/III	24/III	7/IV	9/VI	5/ VII	22/IX	16/X	25/ X	226
	0,04	13/III	22/III	27/ III	10/IV	13/VI	8/ VII	24/IX	19/X	23/ X	225
1	2	3	4	5	6	7	8	9	10	11	12
	0,03	12/III	22/III	22/III	4/ IV	9/VI	5/VII	15/IX	14/X	19/ X	222
	0,04	14/III	21/III	25/III	9/IV	12/VI	7/ VII	18/IX	15/X	22/ X	223

CONCLUSION

When Raney Victoria variety was treated with boric acid at a concentration of 0.02 mg/L, bud swelling began on March 13, and bud break started on March 23, which was 1-2 days earlier compared to the control. The flowering period began on March 25, and the end

of flowering was observed on April 6, starting 7-10 days earlier than the control. Fruit ripening started on June 7, and the end of ripening was on July 7, which was 7 days earlier than the control. Leaf fall completion was recorded on October 20, 9 days earlier than the control. The vegetation duration totaled 222 days, differing by 7 days compared to the control.

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