POTATO FERTILITY UNDER PHOTOPERIOD INFLUENCE

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Abstract: *Researches was carried out in the dynamic of tubers formation at three potato variety (Tresor, Christian and Cumidava)), planted in three different photoperiod, the length of the day in growing tubers period being 14.5, 15.0 and 15.5 hours. Potato fertility are presented progressive under the influence of these photoperiod in 30, 35 and 55 day from emergence.*

Keywords: potato fertility, variety, binding percentage, photoperiod.

INTRODUCTION

Potato fertility expressed as the percentage of binding stolons, that tubers realize by thickening the terminal sides of stolons is an essential expression aspect of the potential of potato. The time of potato binding in Romania generally spans between 15^{th} - 25^{th} of May when the length of the daylight exceeds 15 hours, which justifies the lesser effect upon tuberization and the varieties used in our country mostly belong to the midle-early and midle-late groups for which tuberization is in days of medium or medium-long duration.

Generally in the case of seeding in the conditions of a normal spring, in Romania, between the 1st and 20th of April, tuberization takes place in the end of May when the duration of daylight exceeds 15 hours.

MATERIAL AND METHOD

Three potato varieties, from three different ripening groups were studied: Tresor (early), Christian (middle-early) and Cumidava (middle-late). Researches were conducted in pots, in UASVM Cluj-Napoca greenhouse, year 2011. Seed tubers from the three experimental varieties were calibrated on the same measures keeping count of the correlation between tuber size and the number of sprouts. Tubers were shot in darkness, afterwards exposed to light and then three sprouts were left on each tuber

In order to mark out the influence of light period (photoperiod) upon stolon number and tubers, plantings were made at April 1^{st}, April 15^{th} and May 1^{st}, aiming to have natural daylight for 14.5, 15.0 and 15.5 hours during tuber development period. Biding percentage of stolons was determined reporting the number of tubers to the number of stolons.

The irrigation norm was of 143 ml/plot and total water input was brought up to 80% from active humidity interval.

RESULTS AND DISCUSSION

In variety and light length interaction, at 30 days from emergence of the plants, a significant influence of photoperiode is detected upon stolons binding percentaj. By early planting when tuberization take place in the shortest days, the differences are conclusive. It seems that 14.5 hours photoperiod during tubers formation period is a critical point. If the daylight grows, binding percentaj significantly reduce. If until the 5^{th}- 6^{th} of May daylight length reaches 14.5 hours, the importance of early planting becomes obvious. This way, potatoes will develop tubers at the beginning of May, when daylight does not exceed 14.5 hours (table 1).

Table 1

Influence of photoperiod and variety interaction upon binding percentaj at 30 days from emergence

Cultivar	Photoperiod (hours)	Binding %	%	Dif./t signif.	Duncan test
Tresor	**14,5**	71,70	100	Ctr.	E
	15	43,74	61	$-27,96^{000}$	B
	15,5	58,37	81	$-13,99^{000}$	C
Christian	**14,5**	66,64	100	Ctr.	D
	15	58,52	88	$-8,12^{000}$	C
	15,5	28,57	43	$-38,07^{000}$	A
Cumidava	**14,5**	80.04	100	Ctr.	F
	15	69,28	87	$-10,78^{000}$	DE
	15,5	61,16	76	$-18,88^{000}$	C
Cultivar average	**14,5**	72,79	100	Ctr.	C
	15	57,18	79	$-15,61^{000}$	B
	15,5	49,37	68	$-23,43^{000}$	A
LSD/SD (p 5%) cultivar x photoperiod				3,75	3,75-4,22
LSD (p 1%) cultivar x photoperiod				5,26	
LSD (p 0,1%) cultivar x photoperiod				7,43	

Table 2

Influence of photoperiod and variety interaction upon binding percentaj at 55 days from emergence

Cultivar	Photoperiod (hours)	Binding %	%	Dif./t signif.	Duncan test
Tresor	**14,5**	86,53	100	Ctr.	BC
	15	70,95	82	$-15,58^{000}$	A
	15,5	84,20	97	$-2,33^{-}$	B
Christian	**14,5**	87,28	100	Ctr.	BC
	15	84,99	97	$-2,29^{-}$	B
	15,5	73,30	84	$-13,98^{000}$	A
Cumidava	**14,5**	93,18	100	Ctr.	D
	15	86,93	93	$-6,25^{0}$	BC
	15,5	91,62	98	$-18,88^{-}$	CD
Cultivar average	**14,5**	89,00	100	Ctr.	B
	15	80,96	91	$-8,04^{000}$	A
	15,5	83,04	93	$-5,96^{00}$	A
LSD/SD (p 5%) cultivar x photoperiod				5,39	5,39-6,07
LSD(p 1%) cultivar x photoperiod				7,57	
L SD(p 0,1%) cultivar x photoperiod				10,69	

35 day after the plants emergence, for all three esperimented varieties it was noticed that the binding percentaj grows in short photoperiod conditions. Analyzing the average of the three studied varieties it can be noticed that differences are negatively highly significant at 15 hours of light/day and distinct significant differences at 15.5 hours of light/day (table 2).

Table 3

Influence of the photoperiod and variety interaction upon binding percentaj at 55 days from emergence

Cultivar	Photoperiod (hours)	Binding %	%	Dif./t signif.	Duncan test
Tresor	**14,5**	93,02	100	Ctr.	E
	15	71,88	77	-21,14^{000}	A
	15,5	81,74	88	-11,28^{00}	BC
Christian	**14,5**	89,56	100	Ctr.	DE
	15	69,99	78	-19,57^{000}	A
	15,5	75,00	84	-14,56^{000}	AB
Cumidava	**14,5**	91,86	100	Ctr.	E
	15	75,00	82	-16,86^{000}	AB
	15,5	83,33	91	-8,52^{0}	CD
Cultivar average	**14,5**	91,48	100	Ctr.	C
	15	72,29	79	-19,19^{000}	A
	15,5	80,03	88	-11,45^{000}	B
LSD/SD (p 5%) cultivar x photoperiod				6,71	6,70-7,55
LSD (p 1%) cultivar x photoperiod				9,42	
LSD (p 0,1%) cultivar x photoperiod				13,30	

The same tendency of forming a smaller tuber number (binding %) at a length day of 15, 15.5 hours respectively is detected after 55 days from the plants emergence inception for all three varieties. Analyzing the average of the three studied varieties, 55 days after emergence it can be noticed the significant differences between photoperiods. Duncan test calculation can confirm these assertions (table 3).

CONCLUSIONS

1. For all three time intervals that were considered for determinations regard binding percentaj it was noticed that this grows in short photoperiod conditions.

2**.** A proper tubers formation under our country's geographical conditions happens at 14.5 hours of light which is reached during the first decade of May, this implying an early planting at the beginning of April as to assure the most favourable photoperiod for potato.

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