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EVALUATION OF FLOWERING APPLE TETRAPLOIDS

INTRODUCTION

One of the methods used in plant breeding is the process of polyploidization. Apple triploids and tetraploids usually are characterized by larger organs, higher fruit quality and increased resistance to biotic and abiotic stresses. Apple autotetraploids may serve as a promising source of resistance and could be used for crossing with diploids to obtain triploid genotypes.

The aim of the research was to evaluate apple autotetraploids of four cultivars 'Free Redstar', 'Sander' 'Redchief' and 'Pinova' in relation to their diploid counterparts at the generative phase.

MATERIAL AND METHODS

The research material consisted of four cultivars of tetraploid 'Free Redstar', 'Pinova', 'Redchief' and 'Sander' and their diploid counterparts. The observations were carried out on 4-5 year-old trees, own-rooted and M.9-grafted plants, grown in the experimental orchard. For microscopic pollen observations, anthers were collected at the full flowering phase. A mixed sample of pollen from 10 anthers of each genotype was stained with Alexander's solution. The measurements were determined for 100 pollen grains using light microscopy.

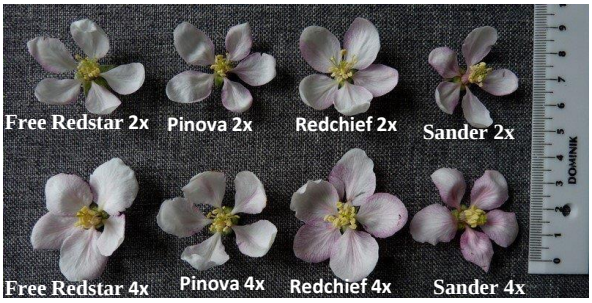
Pollen germination was tested on medium with 15% sucrose solution after 24 h incubation at room temperature.

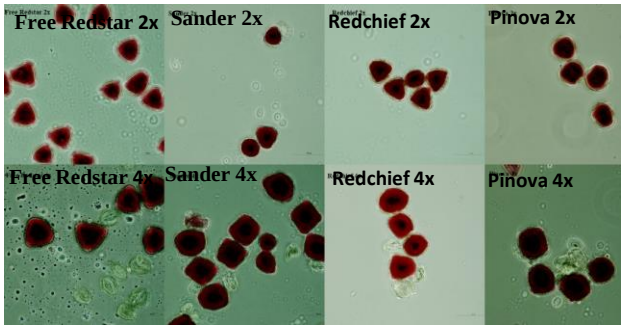
RESULTS

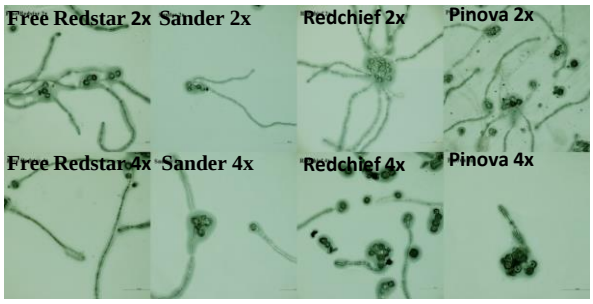
Flowering of tetraploids was delayed on average by two to five days. Tetraploids grafted on the M.9 rootstock bloomed in 51%, and own-root plants in 4%. Diploids bloomed profusely than tetraploids.

In tetraploids compared to diploids:

- pollen grains were significantly larger (in 'Sander' by 60%);
- pollen viability and germination capacity were much lower (with the exception of 'Sander');
- flower diameter was generally higher (in 'Free Redstar' by 20%).







Germination of pollen grains of diploids and tetraploids

Cultivar	Pollen grain length (µm)		Pollen viability (%)		Pollen germination (%)		Flower diameter (mm)	
	2x	4x	2x	4x	2x	4x	2x	4x
Free Redstar	32.8 e	45.2 b	95	49	72	40	43.4 d	52.3 a
Sander	30.7 f	48.2 a	47	75	53	49	42.6 d	49.4 abc
Redchief	32.9 e	41.2 c	91	48	77	48	46.8 c	50.1 abc
Pinova	381 d	48.8 a	78	71	72	46	49.6 b	51.9 ab

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