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Research Note

Some remarks on triploid grapevines

G. STAUDT

K e y w o r d s : triploid grapevines, polyploidy.

Introduction: Triploid grapevines have been reported several times by various authors (PATEL and OLMO,1957, GARGIULO, 1967). While discussing polyploid grapevines at the 2nd International Symposium for Grapevine Breeding in Bordeaux, GOLODRIGA and KIREYEVA (1978) concluded triploid plants as the favourable polyploidy level in grapevines.This statement was probably most astonishing for those studying polyploid grapevines. In the meantime one of the selections from the cross cv. Katta kourgan (2x) x cv. Chasselas gros coulard (4x) was described as cv. Polyvitis Magaratsch (GOLODRIGA *et al.* 1980).

In 1978 sixteen triploid plants of various origin existed at the Geilweilerhof (Institut for Grapevine Breeding) which displayed mostly a very low fertility. Fourteen of these plants showed no normal looking pollen grains, one plant had < 1% and only one plant had up to 8% fertile looking pollen grains and seed set was similarely reduced.

Results: On the strength of the results reported by GOLODRIGA and KIREYEVA extensive crossings were carried out. By using female strains as diploid parents (*V. riparia, V. pubescens, V. labrusca,V. rupestris,* and *V. vinifera* cv. Damaszener blue, Damaszener white, Genueser, Madeleine angevine, St. Louis, Serial and Wachtelei) and two tetraploid strains of cv. Riesling and tetraploid *V. rupestris* as the male parent a lot of seeds were obtained but only a few germinated and grew to well established plants. The chromosome counting resulted in 19 diploid plants with 2n = 38, 15 plants with 2n = ca. 57 and 38 plants with 2n = 76 chromosomes (Table). From these results it can be concluded that in the diploid strains a certain number of egg cells with an unreduced chromosome number had been produced. By crossing with tetraploid males these diploid egg cells have been selected by the diploid sperm cells and resulted in tetraploid zygotes. A similar behaviour, formation of diploid gametes by meiotic restitution, is known from various other plant genera, e.g. *Fragaria* (STAUDT 1984).

Discussion: Although it is known from former investigations (STAUDT and KASSRAVI 1978) that in tetraploid grapevines fertility is reduced in most cases and subsequently the yield is low, the tetraploid plants originated from crosses diploid x tetraploid showed a considerable fertility and yield. It was astonishing to observe a very good fertility in some of these tetraploid hybrids. Pollen fertility was about 80 - 90% and berry and seed set was

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Chromosome number of F 1-hybrids diploid x tetraploid. Root tip chromosome counts were made after fixation in absolute alcohol-acetic acid (3:1) and staining according to Feulgen

No.	Crossing (Species / Cultivar) diploid x tetraploid	Seeds germinated n	Chromosome Number 38	57	76
70,20	Wachtelei x Riesling, Kalkofen	3	-	1	1
70,21	*V. riparia* x Riesling 90	14	3	1	1
70,22	*V. riparia* x Riesling 90	3	-	1	-
70,23	*V. riparia* x *V. rupestris*	38	3	2	1
70,24	*V. riparia* x *V. rupestris*	10	2	-	2
70,28	*V. rupestris* x *V. rupestris*	9	1	1	1
70,30	*V. pubescens* x Riesling 90	4	-	1	1
70,31	*V. labrusca* x Riesling 90	2	-	1	1
71,27	Genueser x Riesling, Kalkofen	5	1	1	-
71,30	Serial x Riesling, Kalkofen	2	1	1	-
71,31	Wachtelei x Riesling, Kalkofen	2	1	1	-
71,33	Damaszener white x Riesling, Kalkofen	2	1	-	1
72,07	Madeleine angevine x Riesling 90	27	-	-	1
72,08	Damaszener blue x Riesling 90	13	2	-	8
72,09	Damaszener white x Riesling 90	1	-	-	1
72,17	Serial x Riesling 90	6	1	1	1
72,18	Wachtelei x Riesling 90	14	1	1	8
72,20	St. Louis x Riesling 90	3	-	1	2

Present address: Prof. Dr. G. STAUDT, Bächelhurst 10 a, D-79249 Merzhausen, Germany.

quite normal as in diploid varieties. Likewise the yield was as good as in diploid varieties and this could be observed nearly every year. The triploid hybrids, on the other hand were mostly weak in growth and regarding the fertility could not compete with the tetraploid hybrids.

It may be the question whether the good fertility of the tetraploid hybrids was a consequence of the genotype of the parent plants or of the generative origin. Most of the tetraploid strains which have originated spontaneously have proven to display periclinal chimeras with a diploid surface layer and tetraploid inner layers, they are ploidichimeras (STAUDT 1973). This should not be expected of the tetraploid plants originated by sexual propagation after meiotic restitution in the diploid mother plants.

Conclusion: From the results it may be concluded that the so called triploid hybrids of GOLODRIGA and KIREYEVA were probably tetraploid hybrids which had originated by the combination of egg cells of the diploid parent with an unreduced chromosome number and sperm cells of the tetraploid parent with a reduced chromosome number.

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