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ALLOPOLYPLOIDY AS POSSIBLE WAY OF COWBERRY SMALL (VACCINIUM VITIS-IDAEA L. VAR. MINUS LODD) ORIGIN

The article sets out the theoretical conclusions obtained by comparing the morphological parameters of experimental F1 hybrid (lingonberry (*Vaccinium vitis-idaea* L.) × cranberry (*Oxycoccus palustris* Pers.)) and plant identified in the flora of Magadan initially named as «cranberry small». According to our hypothesis the plant in the Magadan characterized as *V. vitis-idaea* L. *var. minus* Lodd. (2n = 24) was the result of natural hybridization having similar time of seasonal development primary diploids (dihaploids) *V. vitis-idaea* and *O. microcarpus* (x = 6, 2 n = 12) and the subsequent spontaneous polyploidy arising hybrid.

Introduction. Now in the field of accessary forest exploitation more and more attention is given to berry plantations. It is proved by the fact that accessary forest exploitation [1] for the first time in similar normative documents, along with traditional preparation of wild-growing berries, a new aspect– creation of fruit and berry plantations is included.

Strategic plan of Belarus forestry development till 2015 also indicates the need of their creation [2].

In the result of long-term agro-biological studying of cowberry it was stated that it can become an object of practical plant growing only under the terms of raising weeds competitive and steady against diseases and pests large-fruited, stably high-productive species with early terms of maturing.

The test of introduction forms from different regions showed that use of northern origin genotypes for creation of plantations with positive result under our conditions won't be, however their inclusion in selection process (hybridization) is quite justified [3].

The involved facts gain currency in carrying out researches with use of interspecific hybridization method, aimed at getting model objects with an expanded gene potential on the basis of geographically and systematically remote initial material empirical choice with V. vitis-idaea L participation. Realization of this work has to promote the solution of the task to form hybrid fund – basis of effective cowberry selection. Thus new berry plants of cowberry genotypes having a great practical importance can be grown.

The article tells out the conclusions obtained by comparing of an experimental hybrid morphological indicators F1 cowberry × European cranberry [4] and a plant, identified originally as cowberry small [5] found in Magadan region flora.

Main part. The place of a floristic discovery – a wetland of the plateau located around the settlement Ust-Omchug where along with typical moor plants (sphagnum, marsh tea, cotton grass vagina, bog bilberry) V. vitis-idaea L and also related to European cranberry (Oxycoccus palustris Pers.) small-fruited cranberry (O. microcarpus Turz. ex Rupr.), quite uncommon in this region, enter into the plant association.

Such a plant was said, bears fruits, and is rather abundant. Small (smaller, than V. vitis-idaea has), dark red fruits are formed. The average area of a lamina is 50.4 mm2 that is 2.5 times less, than of the local one (Magadan) V. vitis-idaea.

T-criterion comparison showed – a difference in this size, as well as in lamina length and width is authentically essential at probability level 0.99 (table).

Parameters of lamina (Tteor – 2,58, P – 0,99)

plant No.	Plant	Parameter, mm^2, mm	x+s	V, %	Compared plants*	T_f	Difference between averages **	
							1	0
1	Experimental hybrid V. vitis-idaea × O. Palustris area	area	42.1 ± 1.8	19.5	–	–	–	–
		length	10.4 ± 0.2	10.2				
		width	5.7 ± 0.1	10.5				
2	Floristic discovery, named as V. vitis-idaea L. var. minus Lodd.	area	50.4 ± 3.6	37.1	1–2	1.85	–	0
		length	11.3 ± 0.3	15.7		2.00	–	0
		width	6.2 ± 0.2	18.1		1.80	–	0
3	Magadan V. vitis-idaea L.	area	124.6 ± 5.2	19.7	2–3	11.7	1	–
		length	18.6 ± 0.4	10.5		14.6	1	–
		width	9.8 ± 0.2	4.7		12.7	1	–

Note. * – the minimum volume of selection when comparing plants of 30 measurements, ** – a difference between averages: 1 – authentic, 0 – doubtful.

The ability to vegetative reproduction by means of partial bushes from dormant buds on underground rhizomes is noted. This biological feature is however expressed much more weakly, than that one of cowberry V.vitis-idaea. This plant was transferred to the CBS NAS collection of Belarus.

The comparative analysis showed that it has almost a similar phenotype and habitus, and also statistically major authentic morphological parameters identity of the assimilation apparatus with experimental hybrid F1 V. vitis-idaea × O. palustris (table) [4].

The selection history knows the cases when the plants already existing in natural flora were artificially recreated. So, for example, widespread garden plum (Prunus domestica) was resynthesized by crossing between sloe (R. spinosa) and a cherry plum (R. divaricata) [6].

Thereby the origin of given amphidiploid in the result of interspecific hybridization was proved.

Experimental and literary data allow proposing thesis that found in flora of Magadan the plant determined as V. vitis-idaea L. var. minus Lodd., has a hybrid origin and arose, probably, in the result of spontaneous crossing between V. vitis-idaea and O. microcarpus.

There is one more fact testifying in favour of this hypothesis. In Finland artificial hybrids of cowberry V. vitis-idaea and a small-fruited cranberry [7] were created. Their size of leaves (average length 11.0, a variation from 4.0 to 16.0 mm, the average width 4.5, a variation from 2.0 to 7.5 mm) is amazingly close to the size of leaves of a plant from Magadan. A high degree of external similarity between assumed natural and artificial hybrid [4], despite distinctions in specific composition of possible participants in two combinations of crossing (in the first case cowberry and a small-fruited cranberry, in the second – cowberry and European cranberry), is explicable. As we known O. microcarpus and O. palustris – representatives of the family Oxykcoccus – have very close degree of relationship. In particular, there is a hypothesis that the latter species resulted from allopolyploidia of a large-fruited (O.macrocarpus) and a small-fruited cranberry (O. microcarpus) [8, 9].

In a passive of our hypothesis it is necessary to refer: 1) blossoming diversification of V. vitis-idaea and O. microcarpus; 2) reciprocal artificial hybrids absolute sterility of these species obtained in Finland [7] (while the plant from Magadan bears fruits).

The statement about blossoming diversification of cowberry and cranberries small-fruited isn't absolutely right. So, according to data [10], the cranberry small-fruited, planted on an experimental site, often blossoms the second time in the fall. The secondary blossoming of cowberry at the end of summer–early autumn is a common phenomenon that has been repeatedly described in literature. Thus, matching of blossoming dates of these species in principle is possible.

Some of modern diploidic types are known to be already the secondary polyploids. According to some authors [11–16], those are the types of sort Vaccinium which precursors had a primary haploid number of chromosomes equal 6. Lack of origin diploids as is noted by N. A. Chuksanova [13], is the frequent phenomenon in evolution of plants. Though, by dedicated search, the primary diploids discoveries of native species Vacciniaceae with 2n = 12, may be, still in future. In this connection we will note that lack of data about primary diploids Vacciniaceae, probably, is defined by considerable morphological similarity between diploidic neotypes and origin species. The similar situation, for example, takes place in the sort Onagraceae, where resemblance degree of neotypes with the parental ones is so great that they cannot always be assigned as taxonomical. The secondary natural polyploids having passed a certain way of evolutionary development are also known to acquire properties typical for diploids. So, in particular, in the course of meiosis they form bivalents, instead of multivalents, peculiar to experimental plyploids [13]. This circumstance also, in many respects, clarifies the facts of artificial and natural hybrids of F1, sorts of Vacciniaceae sterility having the same quantity of chromosomes, including V. vitis-idaea × O. microcarpus [7]. Certainly, here it should be mean as well as formed in the course of evolution the certain degree of phylogenetic remoteness of the species involved in crossings.

Conclusion. Thus, in a final version our hypothesis has the following aspect. Growing in flora of Magadan region the plant characterized as V. vitis-idaea L. var. minus Lodd. (2n = 24), resulted probably from a natural hybridization of primary diploids (dihaploids) V. vitis-idaea and O. micro¬carpus (x = 6, 2n = 12) and the subsequent spontaneous polyploidization of the arisen hybrid having a similar phenorhythmic.

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