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METHODS AND EFFECTIVENESS OF HYBRIDIZATION OF LOWBUSH BLUEBERRY (*VACCINIUM ANGUSTIFOLIUM* AIT.) AND NORTHERN HIGHBUSH BLUEBERRY (*VACCINIUM CORYMBOSUM* L.) AT THE STAGE OF VIRGINILE SPECIES

The tested technique makes it possible to obtain sufficient amount of vegetative material for further experimenting. One of the main requirements is to extract seeds from new-gathered hybridized berries without prior stratification. The seeds are then sowed into the young bog peat. High efficiency of hybridization at the virginile stage gives good grounds for further experimenting.

Introduction. Lowbush blueberry (*Vaccinium angustifolium*) has gained a reputation of a perspective introducer in the north of Belarus as evidenced by the results of multi-year research of the forestry department. During the cultivation on the set up high moorland without artificial watering, crop yield of the best selective forms has made 10 t/ha by the fifth year of growing [1]. It should be stressed that in spite of bad weather conditions during separate years (abnormal heat, low temperature in winter without snow covering), during the whole observation period positive dynamics of crop yield has been recorded. Potential of crop yield is possible only in case of regular application of complex mineral fertilizer. The plant is resistant to winter temperature regime. During the period of research entomophilous pathogen situation was rather controllable, its expected scenario for the future is of unalarming character [2, 3, 4]. Capability to form covering due to separation of parent plants, - is one more important advantage of the species [5].

Due to the number of important advantages *Vaccinium angustifolium* it is interesting to involve it into the process of remote hybridization. Examination of ecological and biological and economic peculiarities of species, which can be used in hybridization with *Vaccinium angustifolium*, allows expecting long-term benefits for this at the first stage of study of *Vaccinium corymbosum.* Different breeds are bred abroad in such a way [6]. In Belarus such kind of research has not been carried out.

Vaccinium corymbosum, introduced in our country, is widely spread all over the world. The breed has been selected on the base of remote hybridization of North American representatives of Vaccineaceae, including *Vaccinium angustifolium*. These two plants are both tetraploid ($2n = 48$), though there are hexaploid breeds of *Vaccinium corymbosum* ($2n = 72$). During the last few years *Vaccinium corymbosum* has become rather popular in hobby berrykeeping on farmers plantations in southern and central parts of Belarus. Unfortunately, due to its biological peculiarities it is not resistant at full extent to winter conditions in the north of the country, therefore, berrykeeping with introduced species of blueberries in Belarusian Poozerie is possible only on the base of *Vaccinium angustifolium* at the moment. There are reasons to suppose that remote hybridization with its participation will allow creating preconditions for receiving potentially productive genotypes including the northern part of Belarus which is characterized by existence of considerable number of vacant lands of the set up high moorland including into the category of non-forest lands of goslesfond (state-forestfund).

Main part. During the planning of hybridization experiment, we proceeded from the fact that at present there is a considerable genetic variety of *Vaccinium angustifolium*, represented by 25 intraspecific selective forms tested during the long time, three of which are already registered as breeds for amateur gardening («*Motego*», «*Yanka*», «*Polovchanka*»). To estimate at the fullest extent their long-term benefits and peculiarities as participants of crossbreeding all the used in the experiment forms of *Vaccinium angustifolium* were a sire component, and of *Vaccinium corymbosum* – a meternal. Besides, spectrum of its breeds was limited to two to achieve the goal of the experiment: «*Spartan*» and «*Duck*».

Crossbreeding was carried out, possibly, in good weather conditions (without rain, wind with lots of sun), as a rule, after disappearing of morning dew and until a midday heat. Buds of *Vaccinium corymbosum* were pollinated being at the process of opening but still closed. Opening and removing of floral envelope followed by castration which consisted of pulling out androecium with the help of pincers. Pollen was applied into a style by a light touch with the help of a pyramid cut down from a soft rib and put on at the cutting edge of a microscopic needle. Fresh pollen of *Vaccinium angustifolium* was used. Two-three days prior the pollination anthers together with anther stalks were removed from the buds with the help of pincers and then they were placed by a thin layer on a pergament paper and dried at a room temperature during 24 hours. After that they were poured into penicillin vial, hermetically corked up and stored till the utilization in a re-

frigerator at the temperature of plus 2–3°C. About half an hour prior the pollination vials were uncorked. Separation of flowers was not carried out after the pollination. Plastic labels were put into the branches with pollinated buds. Crossbreeding was carried out in 20 combinations, its size – 1173 pollinated buds of two breeds of *Vaccinium corymbosum* (see a table).

From June 24 to June 30, 2012 picking of formed and ripen berries of all combinations took place. On June 31 seeds were sowed into slightly rotten cottongrass sphagnum peat immediately after separation from the berries, by mulched layer (1-2 mm) of finely cut sphagnum moss. Boxes with seeds were put into a polyethylene hothouse covered with "spunbond". Two weeks later after the sowing seedling started to appear. Peak of activity of this process: end of August – beginning of September. From the middle of September appeared seedling was adopted to the environmental conditions out of the hothouse. Before first autumn frost they were covered with fir twigs. In such a condition hybrids passed the winter and were till the end of March of the next year.

Recording of the plants after wintering which took place in April, 2013 showed that 82.8% of seedlings survived. It should be mentioned that a part of the seeds did not sprout immediately after the seeding, seedlings started to appear within the first ten days in May, 2013, two weeks later, after containers for plants were put into a hothouse again. Number of seedlings appeared next after the seeding makes only 18.2% out of the total. On the one hand this is due to inviability of the part of the seeds. There can be different reasons for this: immature seeds, immaturity of the and etc. On the other hand, as a result of winter stratification, the seeds were under the condition of true dormancy and temperature rise is, evidently, not enough to get rid of such a condition. A complex of measures is necessary to overcome morpho-physiological mechanisms of inhibition of germination that is a theme for another research. It is entirely possible that a part of viable swelled and ready for germination seeds, in spite of being covered was damaged and dyed out as a result of autumn frost. Morpho-biological characteristics definitely testifying about true hybridity of the received experimental plants is a capacity for vegetative reproduction by underground stem which is peculiar to *Vaccinium angustifolium* (only in peat soil) but not to *Vaccinium* corymbosum, a peculiar spherical form of a bush crown, height loss of adult plants (to 40-60 cm). At an intermediate inheritance, a part of the plants will have average dimensions of morphological characteristics. Dominance in the phenotype of some hybridous species traits of a maternal component is quite possible.

Results of the experiment on remote crossbreeding of selective types of *Vaccinium angustifolium* with breeds of *Vaccinium corymbosum* (*Spartan, Duck*)

Maternal component	Sire component (type)	Date of cross-breeding	Number of pollinated buds, pcs.	Number of young berries set, pcs.	Number of formed berries, pcs.	Number of received seeds, pcs.	Received monocyclic seedling, pcs.
Spartan	No. 2	15.05.12	58	30	24	299	23
	No. 3	25.05.12	47	27	20	108	9
	No. 5	16.05.12	57	21	16	56	7
	No. 6	14.05.12	67	43	31	251	16
	No. 7	14.05.12	56	34	24	149	21
	No. 9	21.05.12	74	29	23	63	12
	No. 10	24.05.12	71	39	28	112	23
	No. 11	22.05.12	44	26	12	40	11
	No. 12	20.05.12	85	34	22	52	19
	No. 13	21.05.12	81	43	31	257	29
	No. 24	27.05.12	69	24	17	105	13
Total in combination *V. corymbosum* (*Spartan*) × *V. angustifolium*							131
Duck	No. 3	26.05.12	39	31	24	235	17
	No. 4	15.05.12	43	23	17	180	24
	No. 8	19.05.12	70	35	25	260	27
	No. 10	24.05.12	6	3	2	9	2
	No. 11	23.05.12	51	31	13	75	12
	No. 14	20.05.12	74	34	26	169	26
	No. 15	19.05.12	78	27	21	155	17
	No. 16	19.05.12	34	16	9	57	7
	No. 18	15.05.12	69	48	33	294	31
Total in combination *V. corymbosum* (*Duck*) × *V. Angustifolium*							163

The material under examination was at a virginile stage by the moment of the field survey data (end of August – beginning of September 2013). In connection with this, it was not possible, first of all, evaluate its true hybridity, therefore, secondly, identify the nature of inheritance characteristics of sire and maternal components.

At the same time, it is possible to make a preliminary conclusion about adequateness of the applied procedure of hybridization carried out without any sophisticated laboratory equipment that makes it possible to use it in practice.

One of the main conditions of experimental plant material receiving at the necessary, for further experiments, amount, - as soon as possible without preliminary stratification, separation of seeds from fresh berries, formed as a result of hybridization and their seeding.

Conclusion. Received results at this stage of the research testify about rationality of continuation of hybridization experiment in combination of *V. corymbosum* (*Spartan, Duck*) × *V. angustifolium*.

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