



Introduction

The public breeding program of northern highbush blueberry (*V. corymbosum* L.) was officially started in 2009 at the Department of Breeding of Horticultural Crops at the Research Institute of Pomology and Floriculture (currently the National Institute of Horticultural Research- InHort) in Skierniewice, central Poland (Fig. 1).

The main breeding goals are similar to those implemented in other breeding centers worldwide: good adaption to local climatic and soil conditions, winterhardiness, high yield, resistance to the main fungal diseases, with varying times of fruit ripening. Good fruit quality is also essential: large and attractive fruit that are firm with prolonged shelf life. New cultivars should meet the requirements of the fresh fruit market (dessert cultivars), with fruit of high nutritional value, and also the requirements of the processing industry, with machine-harvestable fruit (Pluta and Zurawicz, 2014).

Material & Methods

Traditional breeding methods are used, consisting of the crossing of selected parental forms, production of an F₁ seedling generation, evaluation of fruiting seedlings and selection of the best individuals (Fig. 2). The high-bush blueberry breeding crossing programme has been conducted on maternal plants grown in the high plastic tunnel. Seedling population is produced in the glasshouse conditions and then planted in the selection fields at the experimental Orchard at Dąbrowice, near Skierniewice for further evaluation. Molecular methods support the classical breeding to accelerate and increase the efficiency of this work.

- **Stage I** - Seedling F₁ population (4-5.000); **1-2 years**
- **Stage II** - Selection (1-2%); **2-3 years**
- **Stage III** - Advanced selection (1-2%); **3-4 years**
- **Stage IV** - Evaluation of best breeding clones in trails (5-10 clones); **3-4 years**
- **Stage V** - Application for registration examination - (1-3 clones); **3-4 years**
- **Stage VI** - NEW cultivar, registration; **1-2 years**

TOTAL - 12-15 years

Fig. 2. The process off the blueberry breeding



Fot. 1. Breeding field at the Experimental Station and selected new clones

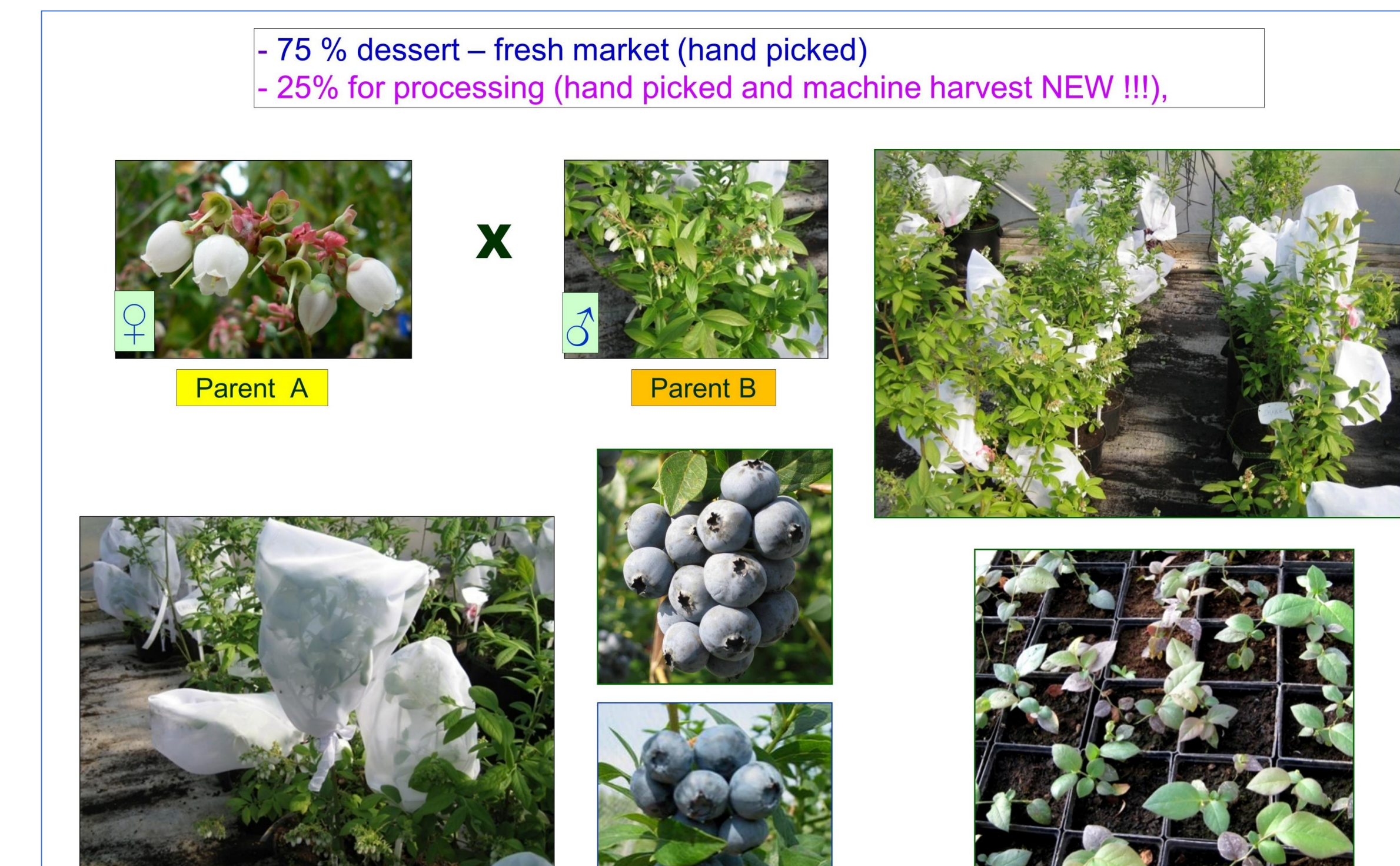


Fig. 1. High-bush blueberry breeding program at the InHort, Skierniewice, Poland.

Results

In 2009-2021, a total of 758 cross combinations were made and over 42,700 seedlings F₁ were raised and planted in the breeding fields for evaluation (Tab. 1). Among the oldest seedlings, about 1,500 valuable individuals (3,5%) were selected and planted in the clone collection (A) for further evaluation and selection (Fot. 1).

Among them about 200 valuable clones were selected, and the best 35 were propagated vegetatively and planted in the collection (B) and also in trials for final assessment and selection of advanced individuals and breeding clones. The preliminary results were published (Pluta et.al.. 2021).

Conclusions and perspectives

- ✓ High-bush breeding programme is very expensive (long term investment, land, people, resources, etc.)
- ✓ Necessity to predict future trends
- ✓ Good cooperation with the Breeding Centers in the World
- ✓ Contacts with the local and foreign blueberry growers
- ✓ It is intended that within 4-5 years new highbush blueberry cultivars bred at the InHort will be submitted for National registration tests.

Tab. 1. High-bush breeding activities conducted at the InHort, Skierniewice, in 2008-2021

Lp.	Years	Number of	
		Crossing combinations	Produced seedlings
1	2008/2009	30	775
2	2009/2010	50	995
3	2010/2011	102	5004
4	2011/2012	78	5500
5	2012/2013	83	10140
6	2013/2014	75	5100
7	2014/2015	24	4890
8	2015/2016	60	1800
9	2016/2017	75	2100
10	2017/2018	73	2241
11	2018/2019	25	439
12	2019/2020	30	2182
13	2020/2021	53	2250
TOTAL		758	42 749