

Improvement and Maintenance of Buckwheat (*Fagopyrum esculentum* Moench.) Variety ‘Oberon’ and its Major Characteristics

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ABSTRACT

We have been dealing with the improvement of buckwheat since the middle of the last decade. Our aim was to develop a variety with rich crops and a high 1000-seed weight and smaller harrowing loss. Improvement was carried out with the Ohio method, which is frequently used with open-pollinated varieties. The types that best suited our purposes were propagated in isolation. As a result of our work, var. ‘Oberon’ was registered by the state in 2006. Maintenance of variety occurs with the Ohio method and by eliminating the divergent types before flowering. The 1000-seed weight of this variety is 30-35 g, i.e. higher than average.

Keywords: buckwheat, plant breeding, variety, Hungary

INTRODUCTION

Due to the high water demand of buckwheat, it is grown in cool, wet (but not permanently wet) areas, usually as a second crop. In Hungary, it is mostly cultivated in northern and western parts of the country, especially in the Órség region (Varga 1970). It is less produced in other regions. From the Middle Ages until recently its sowing area decreased, as more intensive cultures gained priority (Gaál 1978). Nowadays, this trend has been reversed partly due to the increase in human use (healthy nutrition) and partly to its increased utilization as a basic material in the pharmaceutical industry (e.g. flavonoids, rutin, etc.). The hulled grains of buckwheat are used for pulp and as garnish, but buckwheat sausage and buckwheat strudel are traditional foods for those who live in West Hungary.

The ground corn of buckwheat can be used to make boiled pasta. Its flour was used as a substitute for bread in the Órség region in the middle of the 20th century as one-third ingredient in addition to wheat and rye flour. Bread and pastry made from its flour can be eaten even by those who are flour sensitive (Aubrecht *et al.* 1998; Arendt *et al.* 2004).

It has a long duration of flowering and is an excellent honey plant.

MATERIALS AND METHODS

Our ‘Oberon’ variety was improved from many buckwheat populations with the Ohio method described by Bálint (1966, 1969). GMO technology was not used.

Our breeding efforts were greatly limited by the scarce availability of financial means, therefore we had to solve everything in the simplest and cheapest possible way. Initial material of our buckwheat population (being a cross-fertilizing plant) consisted of several hundred genotypes. This biodiversity ensures the ecological plasticity of the population and that its specific features are preserved. A decrease in biodiversity may cause deterioration; therefore we could seek relative homogeneity with only a few phenotype features.

Our breeding aims were, besides high yield, to increase the 1000-grain weight and to decrease the harrowing loss. We wished

to obtain earlier and more intensively flowering varieties with homogeneous ripening.

Initial material was created by crossbreeding bulks of buckwheat populations. We selected mother plants with many big ripe grains. We noted their major phenotypic features. Only the ones with high yield were carried on to stock ‘A’. Judgment was based on so-called ‘limit-based selection’. This means that there was a limit to the number of ripe seeds, 1000-grain weight and grain weight per mother plant. Below this limit, the mother plant was discarded.

Buckwheat is mainly produced as a second crop, thus stocks ‘A’ also had to be evaluated as second crops. Some of the major factors here were rapid initial growth, earliness, yielding and 1000-grain weight. In line with Villax’s suggestion (1947), determination and selection of characteristics of promising stocks was begun as early as in stock ‘A’. In subsequent years, mother plants were selected accordingly. Yielding of stocks was examined for 3 years (‘A’-‘B’-‘C’). In parallel we sowed isolated propagations from stock ‘B’, thus we had a sufficient quantity of seeds for official trials.

To determine variety specific growing techniques, we conducted agrotechnical experiments.

RESULTS

Outcomes of a breeding programme are varieties. In 2006, our buckwheat stock No.430 was officially accepted with the name ‘Oberon’. The results and the description of the variety of DUS tests according to UPOV of the ‘Oberon’ variety are included in **Table 1**, and its pictures in **Figs. 1-5**. The tests were conducted by the Research Centre for Cultivar Testing (Poland). ‘Oberon’'s yield in small-plot trials was 0.3-0.4 kg/m² as main crop and 0.2-0.3 kg/m² as second crop depending on the year.

In average field conditions, we can expect a yield of 2-2.5 t/ha as first crop and 1.5-2 t/ha as second crop depending on the year. Its optimal seed dose is 150 germs/m². Sowing as first crop takes place when the spring frosts are over (in Hungary this means the middle of May) and as a second crop after early harvested plants (in Hungary at the beginning or middle of July) with a row distance of 24 cm (Léder-Falusi 2007).

Table 1 ‘Oberon’ buckwheat (*Fagopyrum esculentum* Moench.) official variety description.

No.	Characteristics	Expression	Note
1	Seedling: anthocyanin coloration of hypocotyl	Strong	7
2	Stem: length	Short	3
3	Stem: color	Light green	3
4	Stem: anthocyanin coloration	Strong	7
5 G	Stem: hairiness	Medium	5
6	Leaf: general leaves	Weak	3
7	Leaf: size	Small	3
8	Leaf: shape	Heart-triangular	1
9	Leaf: color	Dark green	7
10	Leaf: anthocyanin coloration of veins	Present	9
11	Leaf: surface	Undulating	2
12	Leaf: pubescence of veins	Weak	3
13 G	Inflorescence: form	Disk	2
14	Inflorescence: density	Dispersional	1
15 G	Flower: color of petal	White pink	3
16	Flower: color of sepal	Green	5
17 G	Grain: presence of wings	Present	9
18	Grain: size of wings	Small	3
19	Grain: color	Grey	5
20	Grain: character of coloring	Mosaic	2
21	Weight per 1000 grains	Medium (35 g)	5 g
22	Time of flowering	Medium	5

SOURCE: Research Centre for Cultivar Testing (Poland)



Fig. 1 Flowering ‘Oberon’ buckwheat field.



Fig. 2 ‘Oberon’ buckwheat stem, leaf.



Fig. 3 ‘Oberon’ buckwheat inflorescence.

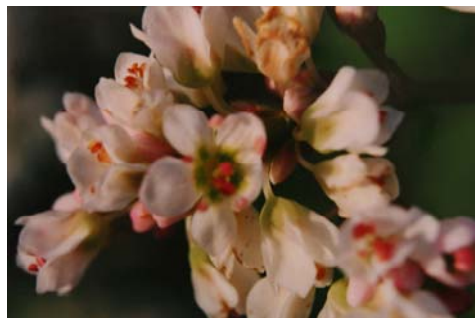


Fig. 4 ‘Oberon’ buckwheat flower.



Fig. 5 ‘Oberon’ buckwheat grain.

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