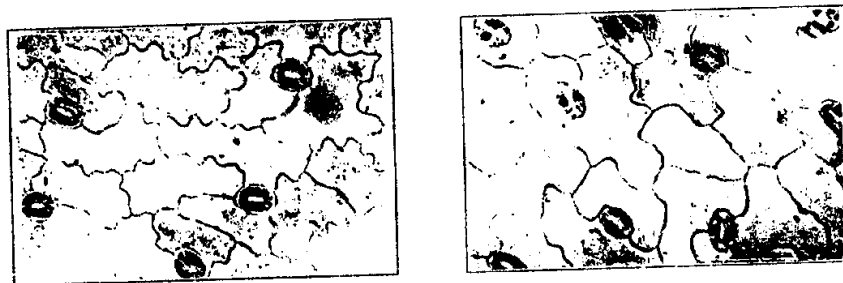


a) the inferior epiderm

b) the superior epiderm

Fig. 6 *Lathyrus latifolius* L.

a) the inferior epiderm

b) the superior epiderm

Fig. 7 *Lathyrus odoratus* L.SOME BIOLOGICAL ASPECTS IN *VICIA FABA* L.

ELENA TĂMAȘ, M.SAVATTI, R.SESTRAȘ

Abstract

ELENA TĂMAȘ, M.SAVATTI, R.SESTRAȘ, 1998, Some biological aspects in *Vicia Faba* L. (in English), Not.Bot.Hort.Agrobot.Cluj, XXVIII

Vicia faba L. is an annual plant useful both in man's and animal's nutrition. Horsebean seeds are rich in protein thus being an excellent source of lysine. One major drawback with these is the presence of vicins, co-vicins and tannins in the seed cover.

Researches were carried out at the University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca and focused upon certain cytogenetical aspects; also, on the biology of flowering and on vegetation period.

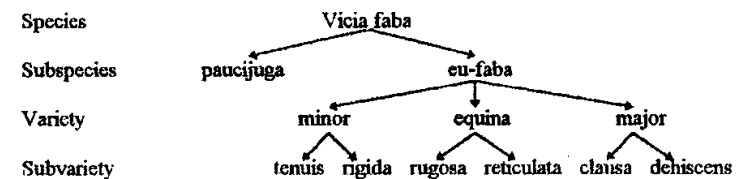
Keywords: *Vicia faba*, biological aspects

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Received:

Vicia faba L. is an annual-legume species, originating in the Mediterranean area, known and grown in ancient times.

The botanical classification of horsebean still raises problems as the bulk of botanists still agree with the classification done by MURATOVA (1931, cf. CUBERO, 1984) who divided the species into two subspecies, i.e., *ssp. paucijuga* and *ssp. eu-faba*.



The variety *Vicia faba* major, also known as "edible horsebean", is cultivated mainly in the Mediterranean area, South America and South-East Asia. The varieties *Vicia faba* equina and *Vicia faba* minor are comprised in animal nutrition.

Differences among botanical subspecies, varieties and subvarieties are based on the shape of pods, as well as on size and shape of the seeds:

- *Vicia faba* minor displays egg-shaped, regular, smooth seeds and short pods of two to three ovules and their destiny is fowl feed;

- *Vicia faba equina* has laterally flattened seeds, large pods of three to four ovules and the weight of one grain is of 0.4-0.6 grams;

- *Vicia faba major* displays large and flat grains, large pods with eight to thirteen ovules; the weight of one seed is over 1 g.

Taxonomically, *Vicia faba* L. is a distinct species of *Vicia* genus. While most of the species belonging to this genus possess $n=7$ metacentric chromosomes of small size, *Vicia faba* L. possesses $n=6$ chromosomes. The double unit of the twelve chromosomes is made up of five pairs of acrocentric chromosomes differing very little from one another and, one pair of metacentric chromosomes, for satellite.

The equina variety to which we shall be referring, exhibits annual herbaceous plants, of over 1 meter high. The stem of three edges does not branch out and has a variable number of vegetative nodes (5-10) and reproductive nodes (7-25). The bud at the very tip is vegetative and the plant has an ad libitum growth. Within best conditions seed yield may reach 40-45 g/ha. Seeds can be used in feeding animals, both in green stage before the stem becomes woody and milled as well.

The papilionaceous corolla of the horsebean is large in size, measuring up to 15-25 mm in length. It is white in colour and it has a black macula on the carina.

The pollen grain is oblong, having a size of 49μ between poles and 33μ at its equator. One flower secretes between 0.5-0.9 mg of intrafloral nectar. The extrafloral nectar is carried by foliar stipules and secreted before flowering.

A plant of horsebean bears 50 to 80 flowers in 2-9 inflorescence. Flowering starts at the bottom of the stalk and involves towards its tip. Horsebean sown in autumn flourishes at the beginning of May and, that in spring starts flowering in June, or the beginning of July.

Within normal conditions the plant behaves just like a self-fertile plant, thus the horsebean is a self-compatible species.

The allopollen and the autopollen simultaneously deposited on the stigma of a flower will germinate in the same manner. During flowering when temperatures are high and accompanied by atmospheric draught, allogamy may reach 60-70%.

There were not noticed any significant adverse effects (depression) on self-pollination. However, fruition is better on lower levels of the stalk where the visit of pollinating insects is more efficient.

Horsebean displays an obvious genotype - environment interaction noticeable in yield instability varying with the ecological area or, with years. One severe drawback in the horsebean compared with other species is too long a vegetative cycle, mainly in the reproductive one.

The length of flowering and that of seed formation is of 90-100 days under the latitude of this country.

Protein content exhibits substantial variability: in the spring type the values vary from 25 to 36 pc. The proteins are rich in lysine but poor in aminoacids with sulphur (methionine and cysteine).

Essentially, seed-quality amelioration focuses on two aspects: lack of tannins and of vicins and co-vicins. Tannins are the outcome of polymerization of condensed polyphenols and are to be encountered with concentrated in the seedcover. Their presence in the nutrition of monogastric animals triggers a substantial lowering in the energetic value and nitrogen utilization in the feed, i.e., by 10-18 pc.

Horsebean flowers possess two types of pigments: one antocyanitic, conferring the blue colour of the banner and, the other, melanistic, responsible for the black stain on carina.

To evict tannins genetically from seeds one can have for marker a pleiotropic gene which decides the entire lack of floral pigmentation, as well as the absence of tannin in the seed cover.

A major limiting factor concerning productivity is represented by the high sensitivity of horsebean to *Botrytis fabae*, *Ascochita fabae* and *Uromyces fabae*.

REZUMAT

ASPECTE PRIVIND BIOLOGIA SPECIEI *VICIA FABA* L.

ELENA TĂMAȘ, M.SAVATTI, R.SESTRAȘ

Vicia faba L. este o plantă anuală, utilizată atât în alimentația omului cât și în hrana animalelor.

Semințele de bob sunt bogate în protine, fiind o excelentă sursă de lizină. Un inconvenient major îl constituie prezența vicinelor, a covicinilor și a taninurilor din tegumentul seminal. Cercetările au fost efectuate la Universitatea de Științe Agricole și Medicină Veterinară din Cluj-Napoca și au vizat unele aspecte privind caracteristici citogenetice, biologia înfloritului și a perioadei de vegetație.

REFERENCES

1. BOND, D.A., 1994, Present status and future strategy in breeding faba bean (*Vicia faba* L.) for resistance to biotic and abiotic stress, *Euphytica*, vol.73, no.1-2, 151-166
2. CUBERO, J.J., 1984, Taxonomy, distribution and evolution on the Faba bean and its wild relatives, *The Hague, Martinus-Nijhoff*, 131-142
3. CUBERO, J.J., M.J.SUSO, 1988, Primitive and modern form of *Vicia faba*, *Kulturpflanze*, 29, 137-145
4. DUC, G., N.BRUN, 1995, Genetic variation in tannin related characters of faba bean seeds (*Vicia faba* L.) and their relationship to seed-coat color, *Plant Breeding-Zeitschrift für Pflanzenzüchtung*, vol.114, no.3, 272-274
5. HAWTIN, G.C., 1984, The development, production and problems of *Vicia faba* in West Asia and North Africa, *FABIS*, 1, 7-9
6. METZ, P.L. 1994, Genetic factors controlling outcrossing in faba bean (*Vicia faba*) - Effects of pollen donor and receptor cross fertilization, *J. Agricult. Sci.*, vol.122, no.2, 249-254.