VARIETIS OF THE FRITILLARY GENRE AND THEIR ORNAMENTAL IMPORTANCE

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Abstract

The present paper desires to make popular the genre of Fritillary plants, in order to rise the interest of the specialists in the culture of flowers and of the ones who love beauty for those flowers. The special decorative aspect of the Fritillary varieties was the ground for the introduction of this genres' varieties in culture, representing an important preoccupation of the specialists for its easy multiplication, and then for the population of the architectural landscape of the public and the private space. We have presented the species of Fritillary genre along with its varieties, on groups of culture and the general characteristics of the four groups, in order to increase the interest for those varieties (table 1). The culture technology can ensure plants grown in pots, multiplied in greenhouses or cold seedlings and also plants grown in free space, on plat bands, rebate or on cliffs. The variety prefers the light, well drained soil reach in humus. It multiplies through its seeds or vegetative through the separation of the bulbs or through the stimulation of rooting, and of the bulbification of the detached scales from the mature bulb, in order to ensure a great rate of multiplication. All varieties of Fritillary lends itself to the classic multiplication with a percentage of the multiplication rate of 85% when we start from the bulbs and of 55% when we use for the multiplication the scales detached from the mature bulb. The germination percentage is determined by the specie or variety. Its ornamental value recommends it for being planted in parks and gardens. The flowering takes place in the third year of multiplication, covering a period poor in flowers, the beginning of summer, after the passage of the bulb and biannual flowers with spring flowering. We recommend its introduction in the architectural space – rebate landscape, solitary or in a multitude of colors (and varieties) for its ornamental qualities and for its capacity to adapt.

Key words: *Fritillary* genre, protected culture, multiplication, conservation, acclimatization, varieties, plat band, rebate, cliffs

INTRODUCTION

Historically, the Fritillary varieties are known from the Antiquity in their place of origin Iran, Afghanistan, on the western flank of the Himalaya Mountains and was brought in the East, firstly at Istanbul, then in 1575 to Vienna, where it spread in other parts of Europe, including the Romanian Countries (*FLORA RSR*, 1966). From the status of vulnerability point of view, they are taxons considered vulnerable – VU (*Dihoru, Ghe., and Negreanu, G.*, 2009), with the possibility of passing in the next sozologic category, meaning to endanger varieties (E= endanger). Endanger is due to the ornamental value of the varieties belonging to Fritillary genre.

Area. Fritillary genre (Liliaceae fam.), comprises over 100 varieties, spread in all temperate regions of the Northeast Hemisphere, specially around the Mediterranean Sea, in the South-East of Asia and in the West of North

America. From the *biologic* point of view, the Fritillary varieties are herbal plants, long-lived, geophytes, loved by honeybees, cultivated with an ornamental purpose, with numerous forms after the color of the flowers and the form of the leaves (il giardino, ED VECCHI EDITORE, Milano 2005).

Species and varieties of Fritillary

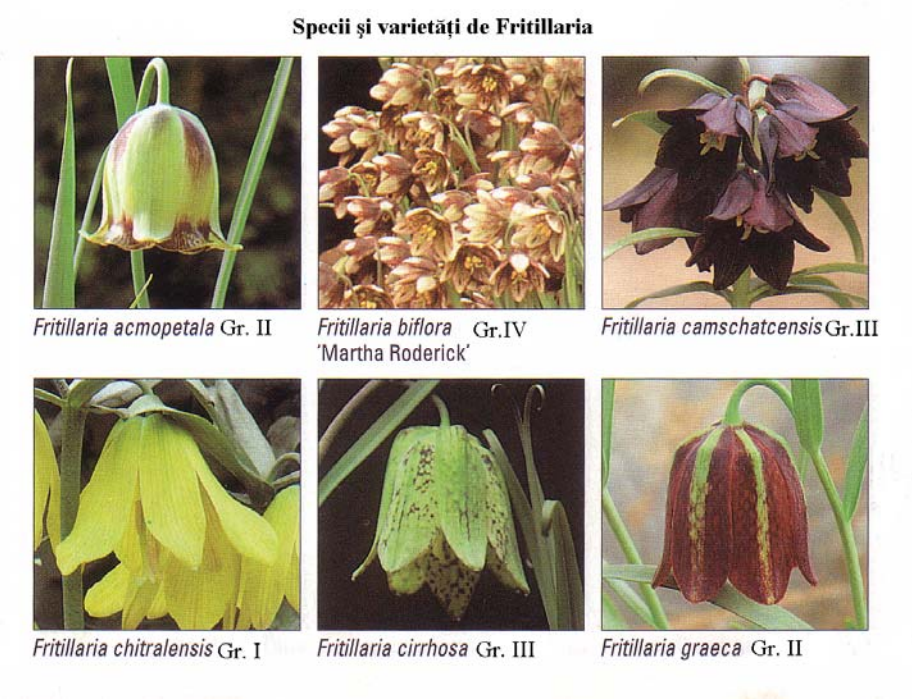

Photo I. Species and varieties of Fritillary from different groups

The form, the color and the arrangement of the inflorescent flowers are elements which give the ornamental value of those species and varieties of Fritillary. They are presented in photos I and II, where we have species from different groups, with different forms and colors of the flowers, campanulas flowers solitary or more accumulated in inflorescence. Photo III presents the Fritillary sewerzowii variety, which can be framed in the second, but also in the fourth group, after its characteristics, having as original feature the arrangement of the flowers in inflorescence and the high capacity to adapt to the conditions of our climate.

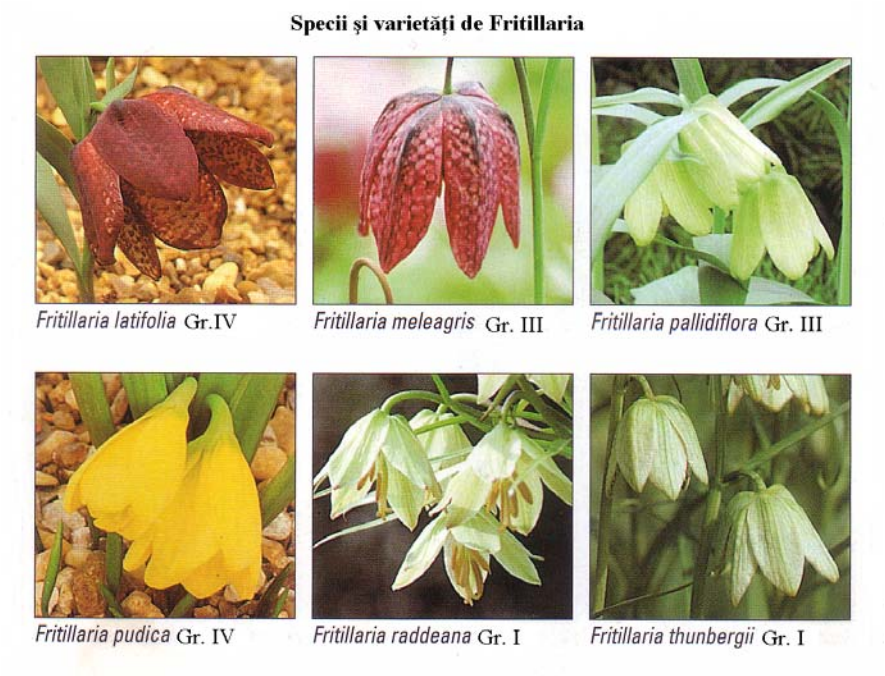

Photo II. Species and varieties of Fritillary from different groups

The rusticity of the specie is given by the simplicity character of the country, as it is apt to resist to difficult conditions of life and existence It also has many popular names, according to the areas where it lives or where it has adapted, as for example: earring, the emperors' beard, tassel, the emperors' crown, lily, tulip, bride, etc. (*Borza, Alex. N. Boşcaiu,* 1965). *The biology* of the Fritillary species can be presented this way: it presents lance with or linear *leaves*, with 1-2 greater leaves and many formations on the top. Some species have, from Mars until June over the flowers with 2-3 leave full bracts (*Ciocîrlan, V.,* 1988). *The flowers* are campanulas, tubular or in the form of a plate coup, pendulous, solitary or reunited in a bunch of grapes or in an inflorescence which takes the shape of an umbrella. The nectarines are visible at the base of the sixth petals. The fruit is a capsule, which is usually rugged and scabrous (*Wharton, E.,* 1995). The *Fritillary imperialis bulbs* have a strong smell, disagreeable which has brought them the fame of having a destructive effect over the mole (*Encyclopédie universelle* des 15.000 de plants, 1999, Ed. Larousse-Bordas). Genetically it is made out on 2n=24 chromosomes.

Photo III Fritillary sewerzowii, a variety with special characteristics concerning the arrangement of the flowers on inflorescence

Ecology. Mezzotherm species, feeble acid, with medium requests concerning the heat. It prefers light soils, rich in nutritive elements, well drained, and sunny, with a pH=6,0-7,2. In the chemical composition of the Fritillary varieties, we can find fritillaries, imperial alkaloids, etc. The alkaloids are toxic and they action over the cord, as before it was considered a medicinal plant. From its bulb was extracted the starch which had an industrial purpose and which after being boiled became eatable. Its flowers are loved by the bees because they ensure them a great quantity of nectar and pollen (*Pârvu, C*., 2003).

Bonnechere, P., talk about the role that the early, massive and long term flowering species have for ensuring an valuable ornamental space (*Bonnechere, P and O. De Bruynl 1998)*, ensuring about the ornamental aspect of a cliff or of a plat band by planting fritillary species. They are being planted either solitary, or more than one varieties of the same species, or in combination with other genres and species which flower in the same period of time or at close intervals (*Bajard, S.,and R. Bencini*, 1996).

MATERIAL AND METHODS

Under the aspect of the material and method of work for this type of scientific study, we approach measures concerning the culture of the species, the aspects of multiplication, the planting conditions and their

acclimatization. In what concerns the Fritillary species there are known two modes of cultivation, one protected in greenhouses or cold seedling, and one on an open area. There are also studies which concern the introduction in the architectural space and in culture of the species with spontaneous flora with ornamental value (*Vlad, M* et all., 2010), with remarkable results concerning the species' adapting capacity to a new space, and also the great rate of multiplication, this one depending on the group to which it belongs (table 1). Experiment end the observations have began in the autumn of 1995 and have lasted about 3-4 years, until the full flowering in the autumn of 1999 when they were planted on then field, on cliffs or in rebate.

Protected culture. It refers especially to the culture conditions of the small Fritillary species (of 5 – 15 cm), which require being cultivated in pots in protected spaces, greenhouse or cold seedling, in order to control the humidity conditions, being known the fact that the specie does not love the soil humidity. In the greenhouse they are planted in full light in a mixture of barren soil, sand and leaf soil. In the period of vegetation they are being watered once a week. And in the at rest the substratum must be maintained barren. The maintenance of the bulbs and bulbils is being done in cold greenhouses or in semi-buried seedlings.

The culture on a free area. Bulbs which are fragile are carefully manipulated and are planted at a depth of third their height. Mature (big) bulbs by their structure, which must be taken into consideration (which are hollow on the top) are very sensitive to rotting, this is why their draining before their planting is essential. The field culture of these species extends on a period of three years: in the first year must be made the generative multiplication (from seeds) or the vegetative multiplication by the detachment of the bulb or of the scales. In the second year of culture we must faithfully follow the technology and the evolution of the starting material, administrating liquid and half diluted fertilizer to the culture once a month. The resulting bulbils are being replanted in a mixture of fresh soil, if it is necessary, and the pot must be changed if it is considered to be too small. The material generated from the scales, planted in small boxes and placed in a greenhouse or in cold seedlings, is being replanted in appropriate pots, concerning the diameter, and they must also be left over winter in conditions of controlled and protected culture. In the third year takes place the definitive planting (in the desired place) and the flowering. In autumn, the material can be placed in the desired area as an ornament. The keeping of the plant material is being done in cold greenhouses or in semi-buried seedlings.

Table 1

The groups of the species and varieties of *Fritillaria* and their characteristics (*Encyclopédie universelle*, 1999, Ed. Larousse-Bordas)

The group	Characteristics	Species/Varieties
I.	- resistant and tolerant to the medium conditions (temperature, humidity); - plants which love sunny places; - used for rebate and cliffs; - planted in full sun or semi-shadow; - they prefer the well drained soil, without natural fertilizers.	*F. affinis, syn. cu F. lanceolata, F armena,F imperialis, F. chitralensis, F. eduardi, F. imperialis, F. pudica, F. stenanthera, F. Thunbergii (syn. F. verticillata var. thunbergii)*
II.	- vigorous species; - they cannot stand humidity in the rest period; - planted in full sun, in a drained soil, little fertile; - ideal to plant on cliffs or on a high hill; - They can be cultivated in seedlings or cold greenhouses.	*F. acmopetala, F. biflora var. Martha Roderick, F. camschatcensis, F. davisi, F. graeca, F. ionica, F. palidiflora, F. persica var. Adiyaman, F. raddeana, F. sewerzowii*
III.	- species for forests and humid prairies; - planted in the sun or in an slack shadow; - they prefer well drained soil, rich in humus and leaf soil.	*F chrrhosa, F. delphinensis, F tubiformis (ssp. moggridgei), F. involucrata, F. meleagris, F. nigra, F. pyrenaica.*
IV.	- short species; - species which do not tolerate humidity; - they are planted in well drained spaces; - in the rest period the bulbs are kept in semi-buried seedlings or in cold greenhouses, in order to maintain the bulbs in perfect conditions for the winter and with a controlled humidity.	*F. assyiriaca, hort., F. bucarica, F. crassifolia, F. hermonis ssp. amana, F. latifolia,var. nobilis, F. messanensis (şi ssp. gracilis), F michailovskyi,F. neglecta, F. oranensis, F. pontica, F. recurva, F. sibthoroiana, F. recurva, F. uva-vulpis (syn. F. assyriaca hort.)*

For the multiplication in the open field we have grouped the Fritillary species and varieties in four groups, presented in table 1. With the exception of the species and varieties from the third group, the others are a part almost entirely from the temperate climate.

Multiplication. The multiplication of the species with an ornamental value and their introduction in the architectural landscape is of great interest. We know the classic methods, but also the unconventional ones which have a multitude of advantages. A special place, from the point of view of the in vitro multiplication, is occupied by the Fritillaria species from the spontaneous flora with ornamental value (*Zăpârţan M.*, 1997). *The seeding* is being done in Autumn, in seedlings, needing the winter cold in order to vernalizeate until the germination afterwards it transforms into a cold greenhouse. The second mode of multiplication is made by the separation of the stem with a portion of the bulb, or the separation of the

bulbs is being done at the end of the Summer. The formed bulbils also ensure a mode of multiplication, as they can be planted in boxes of different sizes in the Autumn in a well drained and rich soil, and they are kept in greenhouses or cold seedlings. (Burnie, G., and all.1999). We must control them periodically to see if they rot, and in Spring we must administrate them natural fertilizer (mixture of dung or of guano).

RESULTS AND DISCUSSION

Fritillaria genre comprises species which ensure the coloristic and ornamental aspect of a space which in a certain time of the year does not have species in flower, they are species with late Spring and Summer beginning flowering (*Roger, P. and R. Martyn*, 1992, Vol. I and Vol. II), with a very different coloristic.

We have followed the percentage of germinated seeds at a specie from each group, then the regeneration and acclimatization of the neoplantlets and regenerated bulbils, presented in table 2. Following table 2, but also fig. 1 we can see the high capacity of germination, acclimatization and regeneration of the specie from group I in comparison with the other groups.

Table 2

Germination, regeneration and acclimatization capacity of some Fritillary species

The Specie	The Group	% Germination	% Regeneration	% Acclimatization	Appreciations
Fritillary affinis	I	80	80	72	xxxxxx
Fritillary davisi	II	58	50	40	xxxx
Fritillary meleagris	III	32	30	20	xxx
Fritillary crassifolia	IV	60	55	45	xxxxx

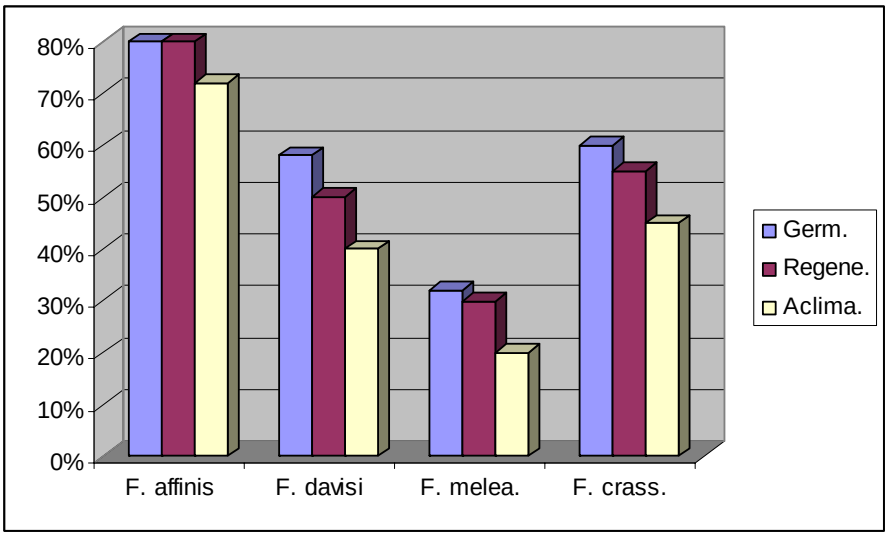

Fig. 1 Germination, regeneration and acclimatization percentage at some Fritillary species: affinis(Gr.I); davisi (Gr.II); meleagris(Gr. III) and crassifolia(Gr.IV)

The success of the culture of the species from Fritillary genre is ensured by the three years of culture until it reaches the flowering period. In this period we must watch the humidity and the temperature from the protected space, the light and the airing of the greenhouse or of the seedling. Then we must administrate natural fertilizer at the indicated periods and the preventive treatments against diseases and pests.

CONCLUSIONS

1. The space where Fritillary species can be placed are in free space or protected in cold greenhouses;
2. The species can be planted single or in mixture with other long-lived species ensuring a novel ornamental space, in plat bands, rebate or cliffs;
3. Decorative by its flowers and stature, *Fritillary imperialis* L has its radical leaves oval – pointed, the ones from the top of the stem are linear, disposed vertically, with campanula flowers long of about 5 cm, ensuring a special design through its form and different color;
4. It multiplies by seeds or vegetative through the separation of the bulbils or through the rooting stimulation, and the bulbification of the scales detached from the mature bulb;
5. It flowers in the third year after its plantation or after the plantation of the mature bulbs, the aspect and the color of the flowers depending on the soils' structure and on the administrated fertilizers.

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