

BEHAVIOUR OF SOME *IRIS CHRYSOGRAPHES* GENOTYPES IN AGROBOTANICAL GARDEN USAMV CLUJ-NAPOCA

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Abstract. Diversification of the ornamental plants assortment with new species and genotypes that exhibit exceptional decorative characteristics has been a continuous preoccupation for specialists in Romania. The testing of these new species and genotypes in the conditions of our country as well as settling technical cultivation aspects are necessary prior to utilizing them for green spaces. *Iris chrysographes* is a species native to Asia that is highly appreciated for the dark violet color of the flowers. At the present time in various collections, for this species there are available hybrids, cultivated forms that often have been bred for darker shades and wild genotypes obtained from seeds collected in the native regions of the species. Cultivars of this species have been introduced and tested in the pedo-climatic conditions of Agrobotanical Garden of USAMV Cluj-Napoca. After two year observation period, has been concluded that accessions belonging to cultivated forms (*Iris chrysographes* “Black Form”) present the best adaptability followed by the hybrid *Iris chrysographes* *x* *forrestii*.

Keywords: perennial geophytes, phenology, black iris, hybrid, wild genotype, cultivated form.

INTRODUCTION

Iris is a large genus of some 300 species (Draghia and Chelariu, 2011). In Romania *Iris germanica* is the ever popular and prized in the garden (Toma, 2009). Irises are mostly rhizomatous or bulbous perennials grown for their flowers, which can be bearded, beardless, or crested. They are one of the best known and best loved garden plants (<http://www.finegardening.com>). *Iris chrysographes* Dykes is a sino-siberian beardless species (<http://research.omicsgroup.org>) belonging to subgenus *Limniris* (<http://www.ars-grin.gov>), and is native to China and Myanmar (<http://efloras.org>; <http://e-monocot.org>). The plants can be admired mainly in the collections of botanical gardens and rarely in private gardens or green spaces. The species is highly appreciated for the delicate habitus and the dark violet tepals which present contrasting veins on the falls resembling golden symbols that inspired the name of the species (Figure 1).



Fig. 1. *Iris chrysographes* “Black Form” (from Edinburgh, planted in 2014),

2nd June 2015 Agrobotanical Garden USAMV Cluj-Napoca

Perennity of the plant is ensured by shortly creeping rhizomes. The leaves are

grayish green on both surfaces, linear, 25–70 cm long, with mid-vein obscure. Flowering stems have between 25–50 cm, and are hollow. Spathes are green, lanceolate. The flowers are very dark violet, velvety, 6–9 cm in diameter; outer segments narrowly obovate, limb with golden yellow stripes; inner segments spreading obliquely, and are narrowly lanceolate. Stamens present purple filaments and violet anthers. Ovary has a size of 3–3.5 cm × 5–7 mm. Style branches are dark purple. The fruit is an ellipsoid 3-angled capsule. The seeds are maroon-brown, semiorbicular.

Flowers appear between June–July (Zhao et al., 2000). Seeds present physiological dormancy (XiaoFang et al., 2013) which makes difficult the generative propagation of this species.

Because the species is sought after for the dark color of the flowers, the breeding efforts are mainly directed to obtaining flowers with darker shades of purple and violet. *Iris forrestii* is a species related to *chrysographes*, and the resulting hybrid presents flowers of a lighter shade of violet due to *forrestii* genitor (Figure 3

Rhizomatous irises are propagating by simple division; *in vitro* propagation is possible (De Munk and Schipper, 1993).

The present study is a brief investigation into the possibility to identify an *Iris chrysographes* genotype that could be used for gardens and landscape in Romania, more exactly in Cluj county area. For this purpose, observations were made, on the behaviour in the conditions of Agrobotanical Gardens of USAMV Cluj-Napoca, of hybrid plants, wild genotypes and two cultivated forms that have been bred for dark shades, belonging to *Iris chrysographes*. And not lastly, to test if short-term cold stratification of the seeds may be able to stimulate germination of the seeds.

MATERIAL AND METHOD

The biologic material was represented by *Iris chrysographes* rhizomes, received from Royal Botanic Garden of Edinburgh, through BGCI. These rhizomes belong to three categories of accessions, which represent the experimental variants:

V₁ - wild genotypes of *Iris chrysographes* obtained by propagation of plants obtained from seed collected in China;

V₂ - cultivated forms: ‘Black Form’ and ‘Dark Form’;

V₃ - hybrid *Iris chrysographes* x *forrestii*.

The *Iris chrysographes* rhizomes were planted in January 2014 in the Agrobotanical Garden USAMV Cluj-Napoca.

Phenological observations of the different genotypes of *Iris chryographes* studied were meant to identify the category with highest adaptability for the pedo-climatic conditions of Cluj County.

Collected data included: number of buds present on the rhizomes prior to planting, measurements of the shoots in different stages of development, and the bloom in first two years from planting.

For the germination study two seed samples were received from the botanical gardens of the universities Bonn and Zurich, the samples were requested using BGCI Plant Search. The samples were seeded in the spring of 2014 and were treated differently:

S₁ - no treatment applied, seeds were seeded in pot with wet soil mix that previously underwent thermal disinfection.

S₂ - seeds were placed on wet media at room temperature for one day, and the wet

bed was changed every few hours; hydrated seeds were seeded in pots with mix of garden soil, sand and peat, and then placed in the fridge for a cold treatment of 7 days at 4°C. After the cold treatment, the pots were placed outdoors.

The germination study was meant to test the temperature treatment on the dormancy of *Iris chrysographes* seeds, and if their un-effectiveness is consistent with results of other recent authors like XiaoFang et al. (2013).

RESULTS AND DISCUSSION

After the first year, based on the data collected it was assessed that none of the three categories studied present an exceptional adaptability from multiple points of view. This assessment was based on the fact that considering different criteria, each category surpassed the other two in certain aspects. Thus, the wild genotypes had the tallest tufts after entering in vegetation, the cultivated forms presented the best percentage of shoots development related to buds present on rhizomes prior to plating, while the hybrid plants had the best percentage of rhizomes entering vegetative stage after planting (Table 1).

Table 1
Parameters of *Iris chrysographes* development in first year after plating the rhizomes

Experimental Variants	Development rate, based on buds present on rhizome prior to planting and shoots development after planting %	Rhizomes entering vegetative stage after planting %
V ₁ (wild genotypes)	50	68
V ₂ (cultivars)	90	75
V ₃ (hybrid)	76	100

Regarding the blooming, in 2014 only *Iris chrysographes* ‘Black Form’ produced flowers, that opened in mid may (Figure 2). In 2015, besides *Iris chrysographes* ‘Black Form’, the hybrid *Iris chrysographes x forrestii* produced flowers as well, at the beginning of June (Figure 3).



Fig. 2. *Iris chrysographes* “Black Form” in 9th, 13th, 16th May 2014, Agrobotanical Garden USAMV Cluj-Napoca

The plants proved more sensitive to pests and disease than other *Iris* species planted in the same section of the garden, with accessions propagated from plants raised from seed

collected in China (V_1) being affected the most, and many plants did not reach the second year after planting the rhizomes. Thus, considering the data collected in the first year, the problems encountered and the first and second year blooming, as well as the observations after the second season regarding *Iris chrysographes* genotypes studied, it was determined that the cultivated forms followed by the hybrids (Figure 3) are best options for the gardens and green spaces in Cluj County area. However, the wild genotypes even though failed to flower in both first and second year despite developing an early vigorous vegetative part, they present importance for biodiversity conservation and thus are of great significance for the botanical gardens, although they do not represent the best option for the private gardens.



Fig. 3. *Iris chrysographes* 'Black Form' and *Iris chrysographes* x *forrestii*
2nd June 2015 Agrobotanical Garden USAMV Cluj-Napoca

In regard with the germination study, the seeds that have not received cold treatment did not germinate (S_1), on contrary the seeds that were placed on wet media for a day and benefited from cold stratification for 7 days (S_2), presented first shoots of 5 mm height after 28 days, and one month later these shoots reached 6 cm in height (Figure 4).



Fig. 4. Seeds, marked pots and seedlings (spring of 2014)

It can be concluded that the cold treatment contributed to breaking the dormancy of the *Iris chrysographes* seeds; the results although favorable are contrary with Xiaofang et al. (2013) that did not succeed to induce germination with various temperature treatments but only by removing part of the endosperm. To be more relevant these initial results, in the future more research concerning this species should be carried out, involving more varieties for the phenological studies and more seeds samples for the germination study.

CONCLUSION

Iris chrysographes is a much more sensitive species, demanding more care than the cultivars of other species of the genus *Iris* with a long tradition as garden flowers. The species requirements are somehow similar with *Iris sibirica*, yet different genotypes might exhibit different adaptability of their rhizomes when transplanted in a new area. It must be said that even if their care is more laborious, it should not discourage the floriculturists because the elegant early summer bloom is worth all gardening efforts (Figure 5). From the genotypes studied, for the gardens of Cluj County area, is recommended the cultivated form *Iris chrysographes* ‘Black Form’, the plants belonging to this variety proved to be more resilient, and flowered from the first year of planting. Compared to this, the hybrid *Iris chrysographes x forrestii* settled a little bit less successful in the first year, but recovered quickly and produced flowers starting with the second season. Regarding the seeds, it was concluded that the dormancy presented in other works (XiaoFang Yu et al., 2013), makes the generative propagation difficult indeed, yet the room temperature wet media during imbibitions and the short term cold stratification helps germination.



Fig. 5. *Iris chrysographes*, 2nd June 2015 Agrobotanical Garden USAMV Cluj-Napoca

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