1956

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Recommended Citation

Lenz, Lee W. (1956) "Two New and Unusual Iris Hybrids," *Aliso: A Journal of Systematic and Floristic Botany*. Vol. 3: Iss. 3, Article 8.

Available at: <https://scholarship.claremont.edu/aliso/vol3/iss3/8>

TWO NEW AND UNUSUAL IRIS HYBRIDS

LEE W. LENZ

A report of new interspecific hybrids in iris is in most instances not unusual since it is well known that species belonging to certain groups within the genus hybridize very readily with one another and produce vigorous and fertile offspring. As an example, almost all the species belonging to the *Californicae* series (Lawrence's classification 1953) will cross with one another and the hybrids in most instances will be slightly, if at all, less fertile than were the parent species.

Hybrids between more widely separated taxa are less common although by no means unknown and a number of the modern tall-bearded iris incorporate species belonging to two, or even three, distinct subsections of the genus. In this case members of the subsections *Pogoniris*, *Oncocyclus* and *Hexapogon* (better known as *Regelia*) are involved. While placed in different taxonomic pigeon-holes, these plants all have one character in common, i.e., they are all bearded iris. Hybrids between more remotely related species are quite rare. One of the hybrids produced at the Rancho Santa Ana Botanic Garden and described here represents what is believed to be one of the widest crosses yet produced in the genus, being a hybrid between a bearded and a non-bearded iris. This plant resulted from a cross between the diploid bearded iris 'Ariel' (Sect. *Pogoniris*, subsection *Pogoniris*) and the common Roof Iris of Japan, *Iris tectorum* (Sect. *Spathula*, subsection *Evansia*) one of the crested iris.

The second hybrid was produced by pollinating a Pacific Coast species, *I. douglasiana* with pollen from *I. sibirica* 'Caesar's Brother'.

Iris 'Ariel' ♀ × *I. tectorum* ♂

Buds of the variety 'Ariel' were opened slightly prematurely, the anthers were removed and the stigmas brushed with fresh pollen from a flower of *I. tectorum*. The flowers were then bagged to prevent contamination. In all six flowers were pollinated. Later it was noted that four capsules appeared to be developing although they were smaller than normal for that variety. By early July the capsules from the flowers pollinated by *I. tectorum* appeared to be turning yellow and shriveling. Earlier work (Lenz, 1954) had shown that it was sometimes possible to remove immature embryos from developing seeds and grow them by using the embryo culture technique. Since it appeared that these capsules would not reach normal maturity if left on the plants, two of them were harvested and brought to the laboratory. Upon examination it was found that they contained a few somewhat normal appearing seeds. These were dipped into alcohol, flamed and opened. The cavity in the seed which is normally filled with a fairly firm white endosperm at the end of eight to ten weeks was found to contain a colorless liquid or a sticky gray substance. When probed with a needle it was possible in almost every instance to find an embryo, somewhat smaller in size than normal but otherwise quite healthy in appearance. These embryos were placed on standard iris embryo agar in test tubes and incubated under the same conditions as are embryos removed from mature seeds. Germination was normal and the seedlings, while small and slow growing, were healthy. When large enough to handle they were transplanted to individual pots and grown on as any other seedling. The two capsules which had been left on the plants were allowed

to remain until they showed signs of dehiscing at which time they were harvested and examined. Only a few badly shrunken seeds were present and when these were opened they were found to be hollow.

In the spring of 1955 two of the plants from the embryo-cultured seed bloomed. It was clearly evident when the flowers opened that they were of hybrid origin, since they combined the characters of the two parents as might be expected in an interspecific hybrid (Figure 1). In color 'Ariel' is a clear lavender-blue self while the usual form of *I. tectorum* is a lavender-blue with lighter hafts and the flower parts, especially the falls, are flecked with reddish-violet. The hybrid is a smooth lavender with no haft markings or fleckings. One of the greatest floral differences between the parents is in form. The flowers of *I. tectorum* open out very flat while those of 'Ariel' have the typical form of a bearded iris. The hybrid, while intermediate, tends more to the form of *tectorum* and as the flower ages it becomes quite flat. The most interesting difference between the parents is in the matter of the cockscomb-like crest of *tectorum* and the 'beard' of 'Ariel'. The hybrid shows a relatively sparse beard superimposed on a crest. Still another conspicuous difference is that the spathe-valves of 'Ariel' are thin and papery while those of *tectorum* are green and herbaceous. The spathe-valves on the hybrid are quite similar to those of 'Ariel'.

Fig. 1. Left to right: *Iris tectorum*, *I. tectorum* $\times$ *I.* 'Ariel', *I.* 'Ariel'

This is probably the third record of a hybrid being produced between a bearded and a non-bearded iris. Dykes in 1910 reported a hybrid which he had obtained from a cross between the dwarf form of *I. pallida* that Sir Michael Foster had obtained from Monte Loppio (later called *I. cengialti* var. *loppio*) and *I. tectorum*. In the first report of this hybrid (Dykes, 1910) he states that he had obtained "a pod of sound seed and from this seedlings were raised early in 1909 of these, the strongest (Lop-tec) has just come into bloom for the first time, and it is obvious that *tectorum* pollen has had considerable influence." In a later paper Dykes wrote (Dilli-

stone n.d) that he had obtained two seeds from this cross which gave him two plants. From Dykes' description of the flower and plant, it is obvious that 'Lop-tec' was very similar to the one described here which was tentatively called 'Ariel-tec'. 'Lop-tec' also had a sparse beard superimposed on a crest and the flower lacked the dark splashes of color so characteristic of *I. tectorum*. In 1928 F. Denis, a French horticulturist, recorded a cross between *I. tectorum* and 'Edina', a bearded iris, that he called 'Pal-tec'. This unusual little hybrid is found occasionally in iris collections today. Figure 2 shows 'Pal-tec' and the present hybrid together. While both were produced from *I. tectorum* and a bearded iris, both presumably diploid, there are considerable differences between the hybrids. From illustrations seen the hybrid described here is more nearly like 'Lop-tec' than it is 'Pal-tec'.

Hybrids between such widely separated taxa are usually sterile and since 1928 when 'Pal-tec' was registered to the present time no seedlings have been obtained from that variety. Pollen from the 'Ariel' $\times$ *I. tectorum* cross was treated with a lactophenol-aniline blue solution and when examined later a number of pollen grains were found to be stained. This was surprising considering the extreme differences between the parental species. Plans were made to attempt backcrosses with the parental plants, but unfortunately this hybrid and its sibling succumbed during the extreme heat wave in southern California in September, 1955.

Fig. 2. Left to right: *I. tectorum* $\times$ *I. 'Ariel'*, *I. 'Paltec'*

Iris douglasiana ♀ $\times$ *I. sibirica* 'Caesar's Brother' ♂

This hybrid, while not resulting from as "wide" a cross as the one described before, is, nevertheless, a most interesting new record. During the spring of 1949 and 1950 a very large number of flowers of *I. douglasiana* were emasculated and pollinated with pollen from 'Caesar's Brother', probably one of the finest of the 'Siberian' irises. Later the capsules were harvested and the resulting seeds were sown

in the greenhouse. In appearance, the hybrid seeds ranged from chaff to a few that appeared to be semi-normal. Of the seeds sown during the two-year period one germinated and produced a slow-growing but healthy seedling. This plant (RSABG #50-130) was later transplanted to the experimental field where it grew rapidly and in the spring of 1953 it bloomed for the first time. Because of its horticultural interest this clone has been registered with the American Iris Society as 'Royal Californian'.

Fig. 3. Left to right: *I. douglasiana*, *I. douglasiana* $\times$ *I. 'Caesar's Brother'*, *I. 'Caesar's Brother'*

With a few exceptions, both floral and plant characters of this hybrid are intermediate between its parents (Figure 3). 'Caesar's Brother' is deciduous, *douglasiana* is evergreen, the hybrid is semi-deciduous. In 'Caesar's Brother' the sepal is separated into a distinct claw and an expanded blade. In *douglasiana* the sepal tapers to the point of attachment without a distinct claw. The hybrid shows an intermediate condition. In color 'Caesar's Brother' is very deep velvety purple. The form of *douglasiana* used was blue-lavender with darker veining. 'Royal Californian' is almost a royal purple with a few darker veins. The flower stalks in 'Caesar's Brother' are hollow, in *douglasiana* they are solid, the hybrid here has the character of the Siberian parent and has hollow flower stalks. This apparent dominant character was also reported by Dykes (1913) in hybrids between *sibirica* and *clarkei* and *delavayi* and *clarkei*. In this case *clarkei* has solid stems while those of *delavayi* and *sibirica* are hollow. The F_1 hybrids in all cases had hollow stems.

Taxonomically the parents of 'Royal Californian' are both members of the subsection *Apogon* but they belong to different series according to Lawrence's classification, 'Caesar's Brother' being a member of the *Sibiricae* and *douglasiana* a member of the *Californicae*.

Cytologically the species belonging to the *Sibiricae* appear to fall into two groups, one with forty somatic chromosomes and the other with twenty-eight. With but one

exception, all the *Californicae* possess forty somatic chromosomes, the one exception being *I. tenuis* which has twenty-eight. Hybrids between the forty chromosome *Sibiricae* and the forty chromosome *Californicae* are not unknown and over a period of years Dykes reported a great many of them. Probably the finest of these hybrids is 'Margot Holmes' which was awarded the Dykes Medal in England in 1927. It is reported to be a hybrid between *douglasiana* and *chrysographes*. So far as is known, all these hybrids have proven to be sterile.

'Royal Californian' is the first record of a hybrid between the twenty-eight chromosome *Sibiricae* and the forty chromosome *Californicae*. As might be expected it is sterile and an examination of the pollen showed almost 100% aborted grains. Horticulturally this clone is attractive and quite distinct from any other known iris.

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