

REPLACING THE BIRD: POLLINATION IN THE GENUS STRELITZIA—MAINLY *S. REGINAE*

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This may appear an unusual title, but I hope the title will become self-explanatory. Some 20 years ago I became interested in producing *Strelitzia reginae* as a plant for the small container market. The normal method of propagation by rhizome division was out of the question due to the large size of the divisions and the high cost of this method. It was decided to try propagation by seed. At this time seed was available mainly from overseas suppliers and cost approximately 3 to 4 cents a seed. After some rather costly and poor germination results with commercial seed I decided to try and produce my own. At this stage I went to the horticultural literature to further study the genus *Strelitzia*.

Description of the genus:

The genus *Strelitzia* was named in honour of the queen of George III of England—Charlotte of Mecklenburg of Strelitz in Germany. This South African genus in the family Musaceae has four species of large perennial herbs with a rhizome or with a woody trunk. Leaves are large, long-stalked, in 2 ranks. Scape is terminal, or in upper leaf-axils, shortly exerted from the leaf-sheaths; bracts 1 or 2, large, boat-shaped, slender-pointed, more or less coloured. Flowers are large, sepals free, long, keeled; petals very dissimilar; stamens 5; ovary 3-celled. Fruit is a leathery, many seeded capsule.

Key to the species (1)

- A Stem not elongated, flowers yellow-blue B
- AA Stem tall, flowers white-blue C
- B Leaves ovate or ovate oblong to lanceolate, *S. reginae*
- BB Leaves bladeless or nearly so, *S. reginae* var. *juncea*
- C Base of leaves cordate, inner flower segments white, *S. alba*
- CC Base of leaves obtuse, inner flower segments blue, *S. nicolai*

S. alba [syn. *S. augusta*]. Stem short. l.-stalk about 6 ft. long, blade about 3 ft. long, shining green. Spathe purple; outer fl.-segs. white, inner white, unequal, very short. March. 1791.

S. nicolai. Stem up to 15 ft. h. l. similar to *S. alba* except that base of blade is obtuse. Spathe chestnut-red, outer fl.-segs. white, inner blue. May. 1849.

S. reginae var. *juncea* [syn. *S. parvifolia* var. *juncea*]. About 4 ft. h. l. bladeless or nearly so, margin flat. fl. blue and yellow. May. 1796.

S. reginae. Stemless or nearly so; plant about 5 ft. h. l.-blade about 18 in. h. with aq l.-stalk of equal length. Peduncle about as tall as l. fl. large, blue and orange, abundantly produced. April. 1773. A variable plant.

STRELITZIA REGINAE

Reginae, meaning "of the queen," alludes to both the queen Charlotte and the regal plant. The common names for this species are: Bird of Paradise, Bird's Tongue Flower, Crane's Bill, and Crane Flower.

Habit: A shrubby, clumping plant growing 1 to 2 metres (3 to 7 ft) in height with approximately the same spread. Small to large, stiff, somewhat banana-like leaves sprout in dense clusters from mainly underground rhizomes. Individual leaves are 1 to 2 metres (3 to 7 ft.) long, blue-grey in colour; the oblong-ovate blade usually has a reddish mid-rib. Flower bracts are born on sturdy stems 1 to 2 metres (3 to 7 ft.) long; 4 to 6 orange and blue flowers are nestled in grey-green, often purple-tinged beak-like or boat-shaped bracts. Individual new flowers appear as preceding ones age and wither. Double-headed bracts on one flower stem are not uncommon. This plant is ornithophilous, requiring nectar-eating birds to pollinate its flowers; it is also protandrous (each flower's male and female organs are not concurrently receptive to each other), therefore the pollinating birds are required to transport pollen from one flower to another.

Flowers: Each flower consists of 3 outer orange sepals and 3 inner blue petals. The central blue petal appears as a short scale, the two lateral petals from around the five fertile stamens and the style look like a single blue dart. Nectar is produced copiously by a gland beneath the small central blue petal at the base of the flower. As honey-eating birds settle to feed, they grip the blue dart against the bract with their feet, the dart's two petals separate to expose the pollen-covered stamens, releasing the sticky pollen onto the birds feet and under body feathers for transport to the protruding stigma of the next flower. Fruits develop in the bract and reach the size of a small hen's egg; when ripe they split into three sections and reveal up to 80 round, hard, blue-black seeds with bright orange filamentous arils. This seed is also disseminated by birds and ground animals. Hand pollination of *Strelitzia* species is necessary due to the lack of suitable pollinating birds outside its natural habitat of the east coast watercourses of the Cape of Good Hope region of South Africa. In Australia some of our native nectar-feeding honey-eaters will accidentally pollinate these plants but this is very unreliable.

Having three large clumps of *S. reginae* with plenty of flowers in my garden, I went about pollinating them, copying the birds, transferring pollen from the stamens of one flower to the stigma of another. The flowers withered and died but failed to set any fruits. The process was repeated a number of times and each time was a complete failure.

Some months later while landscaping an old garden in Kenmore, Brisbane, there were two existing clumps of *S. reginae*

with a good seed set on the old flower heads. The owner informed me that they set seed every year. He also noticed that the mickey bird (*Manorina melanocephala*), or one of the larger and more boisterous native honey-eaters, played in them regularly. I obtained pollen from the flowers of these plants, then cross-pollinated the flowers on my own plants. At last, results—fruit capsules started to form in the bracts at the base of the spent flower. Some eight months later a good crop of seed was obtained.

It seems the secret of success was cross pollination of one clone to another. All the plants in my garden were from the division of one plant, and this was most probably the reason for the early failures. In nature, the clumps consist of seedlings and this accounts for pollination within the flowers of one clump.

Over the years I have tested self-pollination and cross-pollination on the same clump and all results are similar. I have come to the conclusion that cross pollination is necessary for good seed set with all species of *Strelitzia*.

PRESENT METHODS USED TO POLLINATE *S. REGINAE*

(1) **Collection of Pollen.** Pollen is collected from selected plants in a number of locations around Brisbane. This ensures a good range of pollen for cross pollination.

The wings of the blue dart of the flower is pressed open with two fingers to expose the stamens. A plastic drinking straw is used to remove the pollen by sliding the open end of the straw from the base to the tip of the dart. The pollen is then collected up the centre of the straw. This is repeated on other flowers until enough pollen is collected. The pollen laden straws are marked to record the pollen source, and stored in a refrigerator for future use.

(2) **Pollination.** As soon as a fresh flower opens from the boat-like bract, and the white stigma at the tip of the blue dart-shaped petals becomes very sticky, coat the sticky stigma with pollen from the drinking straw. I usually pollinate the flowers in the early morning although reasonable results can be obtained anytime during the day. The main flowering period for *S. reginae* in Brisbane is usually March to July. I usually restrict pollination to that period.

(3) **The seed.** Seed capsules will start to appear in the bracts as a swelling at the base of the spent flower in three to four weeks. In 8 to 9 months (October to February) the capsule will be about the size of a small hen's egg and protrude above the bract. When ripe the capsule splits open in three sections to reveal the blue black seeds. Only remove the split open capsule with a twisting action from the bract, allow to dry and split open completely to remove the seeds. Each capsule will hold 50 to 80 seeds. Most bracts will produce 4 to 6 seed capsules.

PROPAGATION

Seeds are set in 10 cm deep flats in a mix of $\frac{1}{3}$ peat, $\frac{1}{3}$ perlite and $\frac{1}{3}$ fine pine bark. The seeds are covered to a depth of the seed. The flats are placed under 50% shade and germination usually takes place in 6 to 10 weeks during the summer to autumn period. Bottom heat of 35 to 38°C will speed up germination, but in the Brisbane climate it is an unnecessary luxury. Germination from fresh seed is always excellent. Seedlings are then pricked out and potted to 7.5 cm tubes for sale.

Strelitzia is an interesting genus where all species can be hand pollinated as above; a ladder is a great help to pollinate the taller species. Cross pollination between species is also possible and a number of hybrids are available. *Strelitzia* flowers are the only ones in the world that are known to use a bird's feet as a means of pollination.

REFERENCES

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