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Hort 5051

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*Babiana tubulosa*

### **Taxonomy:**

*Babiana tubulosa* is a geophyte native to the Western Cape of South Africa in Darling, Mamre, and Langebaan. The species is in the family Iridaceae which is more commonly known as the iris family and is a monocot<sup>4</sup>. The genus *Babiana* consists of approximately 80 species, 49 of which are found in the Southwestern Cape of South Africa with the rest found in the Northern Cape<sup>5</sup>.

### **Geographic Distribution:**

*Babiana tubulosa* is native to the Western Cape of South Africa in Darling, Mamre, and Langebaan which are 30-35°S and 15-20°E. It can also be grown in part of Southern California and parts of Western Australia. The species can be found at elevations 0-1600m. In the Western Cape of South Africa, the climate is Mediterranean. This species can be invasive in optimum growing conditions because it can self seed<sup>5</sup>.

### **Native Habitat:**

*Babiana tubulosa* can be found growing in sandy to a sandy loam soil. This species is found to grow in the winter (May-July in South Africa) and flower in late winter/early spring (August-October in South Africa). Based on the Mediterranean climate, winters are wet with temperatures ranging from 7°C/45°F to 18°C/64°F which is when the plant typically grows and hot, dry summers with temperatures ranging from 15°C/59°F to 27°C/81°F when the plant is

dormant<sup>7</sup>. *Babiana tubulosa* is part of the fynbos biome which is characterized by having the largest number of plant species of any biome in Africa (7,500), having a Mediterranean climate, occasional fires to regenerate which *B. tubulosa* is known to survive<sup>7</sup>, and poor soil<sup>2,5</sup>. The species may be in threat by urban expansion in Langebaan and by livestock trampling and overgrazing in Darling and Mamre<sup>5</sup>.

### **Taxonomic Description:**

*Babiana tubulosa* is a geophyte which is classified as an herbaceous perennial. It grows underground storage organs known as corms that are pulled down by contractile roots<sup>6</sup>. The overall size of *B. tubulosa* is approximately 3-6"/7.6-15.2cm in height and 2-4"/5.1-10.2cm in width<sup>4</sup>. Leaves are approximately 5-15cm in length<sup>1</sup>. Flowers are found six to twelve in a dense spike<sup>1</sup>. They are showy, white with red, triangular to spear-shaped marks on the lower tepals, and a 3" tube<sup>4,6</sup>. Flowering occurs in late winter/early spring which in South Africa is August-October<sup>7</sup>. There was no information on uses by indigenous people that could be found.

### **Cultivars on Market:**

No known cultivars on the market could be found in researching *Babiana tubulosa*.

### **Propagation Methods:**

Propagation can be done from seed or vegetatively from the corms. In the wild it is spread through seed<sup>7</sup>. According to an email from the Pacific Bulb Society<sup>6</sup>, seed will germinate in 6-8 weeks. I would propose using sand as the germination media as the typical soil is sand to sandy loam and a temperature of 21°C in a misthouse when germinating seed and allowing seed to germinate for up to 8 weeks. *Babiana tubulosa* is self-compatible based on research meaning that it can produce viable seed by self-pollination<sup>3</sup>. When propagating from seed, flowers do not form until the second or third year. Vegetative propagation can be done from corms of *Babiana*

*tubulosa*. This will allow for plants to flower in the same year<sup>4</sup>. If you want the plant to flower in the first year, propagation from corms would be best while plants grown from seed will take 2-3 years to flower. No information has been found in the literature on the number of seeds produced per flower or if there is any seed dormancy.

### **Product Specifications:**

Because of the showy flowers, *Babiana tubulosa* with the phenotype it already has will be desirable as a container plant or as a cut flower.

### **Market Niche:**

In Minnesota, the target sales date would be early to middle of May when it begins to get nice. This crop could be in flower and used as an early flowering crop in containers. *Babiana tubulosa* could be used as a container product or cut flower for Mother's Day or perhaps Valentine's Day because of the showy, unique flowers and the red marking that is similar to a heart shape. This species could be forced inside year-round however for outdoor use it would be forced for late spring/early summer in Minnesota flowering in May-June. In other parts of the United States such as Southern California which has a similar climate to South Africa it can be grown during the winter and would flower late winter/early spring (February-April). Where the climate is warm enough such as Southern California, *Babiana tubulosa* could be used as a mixed border or in a rock garden/wall<sup>4</sup>. Since *Babiana tubulosa* is in the Iridaceae family, it might compete with other irises, but the flowers are unique which will help this plant to jump out to consumers. There aren't any known stories about this crop. The initial limitations or problems for this crop will be that it takes 2-3 years to flower from seed and takes 6-8 weeks to germinate which will slow the production and sale of the crop. Growers and consumers should be able to identify *Babiana tubulosa* in that it is related to other irises based on the leaf shape, flower

shape, and overall appearance. This will make it easier to sell. Based on the growing requirements and product potential, I would estimate that the product will be available in 5-10 years.

### **Anticipated Cultural Requirements:**

Based on the climate in the Western Cape of South Africa the USDA winter hardiness zone is 9-11 and the heat zone is also probably 9-11 based on the Pacific Bulb Society<sup>6</sup> growing other species of *Babiana* in Southern California which is heat zones 9-11 and knowing that *Babiana tubulosa* grows in the winter and is dormant in the summer so it is more heat and drought tolerant. Optimum growing temperature should be similar to that of the typical temperature in the Mediterranean during the winter ranging from 7°C/45°F to 18°C/64°F. As temperatures begin to get warmer, *Babiana tubulosa* will flower and then go dormant. *Babiana tubulosa* should be grown in full sun<sup>4</sup>. The estimated photoperiod is short days based upon the fact that they flower in late winter/early spring. A well-drained sandy or sandy loam soil is the optimum media for growth of *Babiana tubulosa* because it grows on sandy soil in the wild which also means that nutrition does not need to be high because sand does not have a high cation exchange capacity. No use of PGR's, fungicides, or insecticides can be found in the literature. There is also no mention of disease resistance or susceptibility in the literature. Based on the height and width of the plant, I would recommend at least a 4" pot however a deep pot would work best because of the contractile roots which pull the corms to the bottom of the pot.

### **Complete Production Schedule:**

*Babiana tubulosa* will likely be sold as a container plant in Minnesota or as a cut flower for Mother's Day or perhaps Valentine's Day. In parts of Southern California it can be sold as a perennial for outdoor use. An experiment was performed to grow *Babiana tubulosa* from seed

(30 planted) in the misthouse at 21°C for 4 weeks in germination mix. Unfortunately, none of the seeds germinated. Upon communicating with the Pacific Bulb Society<sup>6</sup>, it was discovered that seeds take 6-8 weeks to germinate in sand or a sandy loam. After 4 weeks in germination mix, 3 of the seeds were moved to sand, and 3 new seeds were also planted in sand. Unfortunately, this also did not yield any germination. Therefore, in production the recommendation is that it will take 6-8 weeks to germinate the seed in sand or sandy loam based on information from the Pacific Bulb Society<sup>6</sup> and research done in this experiment. In looking at the growing season in South Africa, it appears as though flower buds would develop in 8-10 weeks from a mature plant with flowering occurring 10-12 weeks after growth has begun. Shipping would occur after buds have developed in 8-10 weeks. There are no known special treatment applications. The target sales date seasonally in Minnesota would be flowering in early to middle of May as a container plant or February to March in warmer climates such as Southern California. As a cut flower *Babiana tubulosa* would be great for Mother's Day or perhaps Valentine's Day. In using this species as a cut flower, the flowers should be showing color upon harvest which typically in flowering plants happens 3-5 days before the flower opens.

#### **Needs for Genetic Improvement:**

A few crop improvements are necessary. First, an earlier germination would be optimum to reduce the time of production. A shortening of the juvenility period from seed would also be optimum so that they can flower in the first year. Cold hardiness would be an interest for growers in colder climates and those who wish to have flowers earlier in the season. Finally, repeat blooms would be an interesting trait as this would allow consumers to enjoy the flowers for a longer period of time.

**References:**

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3. Goldblatt PG, John Manning. Floral biology of *Babiana* (Iridaceae: Crocoideae): Adaptive floral radiation and pollination. *Ann Mo Bot Gard* 2007;94(4):709-33.
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5. Manning, J.C. & Raimondo, D. (2006). *Babiana tubulosa* (Burm.f.) Ker Gawl. National Assessment: Red List of South African Plants version 2013.1. (29 April 2014).
6. Pacific Bulb Society (14 April 2012). *Babiana*. Pacific Bulb Society (29 April 2014).
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