

# ALSTROEMERIA CULTURE

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## Introduction

The new Alstroemeria cultivars that are available from Europe (Table 1) are the result of years of interspecific breeding and irradiation to induce mutations. The majority of the new hybrid cultivars have originated from the van Staaveren Company (The Netherlands) and Parigo Seed Company (England). Recently, the Wulfinghoff Company (The Netherlands) have introduced several new and interesting Alstroemeria cultivars. Plants are normally leased from the breeder; also, a yearly royalty is assessed on the square footage in production. The Fred Gloeckner Company is the United States representative for the van

Staaveren Company while the other firms, as far as we know, have no U.S. representative.

Alstroemeria species come in many different shades of reds and yellows. The wide color range found in the hybrids arises from this diverse color base found in the species. The native species are found in numerous habitats ranging from the snowline of the Andes high mountain plateaus in South America down through the highland forests to the coastal deserts. The different habitats result in specific requirements for flowering. The requirements for floral induction in the hybrids can be separated into 2 groups; the white/yellows, which originated from one interspecific cross and the red/orange, which originated from several different interspecific crosses. The white/yellows require a shorter cold period, a higher devernalization temperature and a shorter daylength for flowering than the red/orange group.

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Table 1: Some *Alstroemeria* cultivars by color

**Bronze**

Harmony (S)

**Orange**

Campfire (S)

Harlequin (W)

Orange Beauty (S)

Orchid Florin (P)

**Pink**

Capitol (S)

Mona Lisa (S)

Pink Perfection (P)

Regina (S)

Rosali Staliro (S)

Rosita (S)

Trident (W)

**Red**

Carmen (P)

Fanfare (W)

King Cardinal (S)

Red Sunset (S)

Red Surprise (S)

Result (W)

Valiant (W)

**Red-Purple**

Marina (P)

**Yellow**

Canaria (S)

Orchid (S)

White Wings (S)

Yellow Tiger (S)

Zebra (S)

P - Parigo; Spalding England

S - M.C. van Staaveren; Aalsmeer, The Netherlands

W - A. Wulfinghoff; Rijnsuijk, The Netherlands

**Plant Characteristics**

As the leaves on an *Alstroemeria* shoot unfold, they rotate 180° so that the upper surface becomes the under surface. The flowering stem consists of a circular arrangement of flowering cymes (a stem with central flower blooming first) with each individual cyme bearing one to five symmetrically arranged flower buds. Within the whorl of cymes, the flowers open sequentially from base to tip with each flower on its axis reaching maturity as the next flower opens.

The *Alstroemeria* plant consists of a white fleshy underground stem (rhizome) producing aerial shoots, and a root system which is moderately fibrous and which can become thickened like a dahlia. The growing point of the rhizome, which gives rise to aerial shoots, exhibits symmetrical branching, starting at the base. Each new aerial shoot arises from the first node of the preceding shoot, and a lateral rhizome develops in the second node of the aerial shoot. These lateral rhizomes give rise to additional aerial shoots.

The aerial shoots can be either vegetative or reproductive. Normally, shoots that have unfolded more than 30 leaves will not flower and are vegetative. Once rhizomes are induced to flower by low temperatures and long days, all shoots that form will flower until the new shoots are no longer induced due to high soil temperatures.

**Flower Induction**

The flowering control mechanism for *Alstroemeria* hybrids appears to have two requirements: a primary cool temperature requirement and a secondary photoperiod (daylength) requirement. As stated earlier, the temperature effect shows a group specificity with the "Orchid" type (white/yellow group) requiring a shorter cold treatment (2 to 4 weeks of 40° F (4.5° C)) for floral induction. The variability between the two groups may be related to the parentage of the cultivars. The white/yellow cultivars have one parent (*A. violacea*) from the coastal deserts where the average winter temperature is 55° F (12.7° C). The pink cultivar 'Regina', from the red/orange group, has parents (*A. pelegrina*) from the highland forests where the average winter temperature is 52° F (11° C). The other parent, in both hybrids, was *A. aurantica*, suggesting that each

species that goes into a new hybrid may modify the flowering control mechanism.

Once flowering begins, the plants will continue to produce flowering shoots indefinitely until the soil temperature goes above 60° F (15.5° C) for extended periods. When vernalized plants (plants subjected to low temperatures) from the red/orange group are grown at 70° F (21° C), or plants from the yellow/white group are grown at 76° F (24.5° C) plants will quickly cease flowering and will not flower again until they receive a cold treatment. When plants were grown at continuous 55° F (12.7° C) soil temperature, the plants continued to flower indefinitely regardless of air temperature, which exceeded 95° F (35° C) during the summer. Since the below ground part of the plant must be kept cool (55° F) for continued flowering, deep soil mulches or misting the mulch to encourage evaporative cooling will help maintain a cool soil temperature in conjunction with evaporative air cooling.

The other component that controls flower induction is photoperiod. Once plants have perceived an adequate cold treatment, 13 hours of light, as obtained by using standard chrysanthemum lighting as a night interruption, hastened floral initiation. Lighting non-vernalized plants will not induce flowering. Photoperiods longer than 13 hours will not promote any earlier flowering, but may decrease flower production. We have found a 4 hour night interruption (incandescent source, 2200 to 0200 hours) adequate. Another method we have used is to add the length of normal existing daylength plus x hours of night interruption in order to equal 13 hours. Thus, the span of lighting varies weekly as night length increases or decreases. These night interruptions are effective in promoting earlier flowering without decreasing flower production. Lighting should occur about September 1 to April 15 at 45° N latitude (St. Paul, Minnesota). Check with your local weather bureau to determine the exact dates when the daylength is less than 13 hours at your latitude.

Light intensity has been shown to affect flower development. In northern Europe where light intensity in the winter is significantly reduced, bud blasting is a problem. In Minnesota we have only occasionally observed bud blasting and this may have been related to soil temperatures which

were too cool. Thus, in the northern U.S., light intensity may not be limiting to the degree that it influences bud development. But, low light intensities may decrease stem diameter. Since the number of cymes per stem is positively correlated with the stem diameter, *Alstroemeria* should be grown with the maximum available light so that a maximum number of cymes per stem can be obtained.

## Propagation

*Alstroemeria* plants should be divided every second or third year, depending on the cultivar and growth characteristics. When an excessive number of thin, weak shoots are produced, the plants should be divided. About 1 to 2 weeks prior to dividing, plants should be severely pruned leaving only the youngest 6 to 8 inch shoots. The pruning will facilitate handling. When digging well established plants after flowering decreases in late summer or early fall, care should be taken to dig deep enough to get the growing point as the rhizome can grow 12 to 14" deep. Excess soil should be removed from the clump to expose the individual rhizomes. Each new division should consist of a single rhizome with an undamaged, blunt growing point, some new aerial shoots and, most important, some large fleshy storage roots.

The presence of these thickened storage roots is critical for the reestablishment of the plants since the first new roots will arise from these enlarged storage roots. Normally only the youngest 1 to 3" of rhizome is kept with the older portion being discarded. These older rhizomes are of no value as the lateral rhizomes that may arise from them are weak and do not appear to regain vigor.

**IMMEDIATELY** after the rhizomes are divided, or new rhizomes are received, they should be planted. We have observed that when planting is delayed after division, reestablishment is delayed considerably. It is essential that pots, soil or ground beds be ready **BEFORE** plants are divided or received. Normally, extra plants are potted up to replace plants that die or are not as vigorous as others. It is expected that 5% to 25% of the plants will not survive bare root transplanting. To increase the survival rate, a fungicidal drench (8 oz per 100 gal water each of Lesan and Benlate) is recommended at the time of planting and again a month later if vigorous root growth is not observed.

Excess watering will quickly rot the rhizomes. After the initial watering with the fungicidal drench, spot water plants as they become dry. Grow the plants at 60° F (15° C) until they become well established (4 to 8 weeks), before lowering the temperatures to 40° F (4.5° C).

When new growth commences, numerous shoots will form. Removing some of the weak vegetative shoots was shown to increase flower production. Shoot removal acts as a "pinch" and encourages growth of the lateral rhizomes. Stems may be cut at the soil line or a quick upward pull will cleanly remove the shoot from the rhizome. Flowering shoots are harvested when the first group of flowers begin to open. Care should be exercised with young or poorly rooted plants since the rhizome may be uprooted or torn loose from the soil if careless stem removal occurs.

There are currently two methods for marketing *Alstroemeria*. One method simply places 10 to 12 flowers in a bunch. The more desirable method places the stems into 3 grades. Grade 1 has stems with 5 or more cymes per 36"+ stem length, grade 2, 3 to 4 cymes per 24"+ stem length and grade 3, less than 3 cymes per 12"+ stem length. Stems are downgraded for crooked or damaged stems or poor foliage. A strong 3 to 4 layer support system is recommended. *Alstroemeria* can produce shoots up to 6 feet tall.

*Alstroemeria* are heavy feeders. Research has shown that greater flower production is obtained when the nitrogen to potassium feed ratio is 1:2. Ammoniacal forms of nitrogen fertilizer should be avoided, as at 55° growing temperatures, ammonia is not readily converted to nitrate. Application of minor nutrients may be required to maintain optimum levels within the plant.

Insects and diseases are not a large problem on *Alstroemeria*. Whitefly and aphids may appear during warm weather. *Alstroemeria* foliage is very tender, thus insecticide sprays should be applied only on overcast days otherwise foliar burn may occur. We have observed leaf mottling and verified this as a virus infection. The virus induced symptoms of malformed leaves and tends to be temperature sensitive with symptoms disappearing at 55° F and reappearing at 70° F. Rogue virus infected plants to reduce the spread of the virus. There are currently efforts underway in Europe to produce virus free stock.