Pollination of Citrus Hybrids[1]

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Many of the popular citrus hybrid cultivars developed and released during the last few decades have problems of sexual self-incompatibility which may result in low yields. In the normal flowering process, pollen is deposited from the stamens onto the stigma of an open flower. This is usually done by visiting insects, most often bees, in search of nectar. Since the stamens are adjacent to the stigma, self-pollination is what most often occurs naturally. Even when pollen comes from nearby trees in solid blocks, self-pollination occurs since the varieties are the same.

With self-incompatible varieties, self-pollination does not work because the pollen tube grows down the style into the ovary (fruit) too slowly and sexual fertilization does not actually occur. In many of the citrus hybrids, sexual fertilization and the resultant production of seeds is necessary for commercially acceptable yields.

Self-incompatibility can be overcome by cross-pollination with another compatible cultivar (Table 1). This is usually accomplished by mixing compatible trees within a planting to insure good bee visitation between donor and receptor trees. A pollenizer tree should not be further than the third tree away from the tree that is to be pollinated in order to ensure good fruit crops. On the other hand, cultivars such as Robinson are prone to set excessive fruit crops if the frequency of pollenizer trees is too great. This can lead to small fruit sizes, limb breakage, and alternate-bearing problems. The pollenizer trees are subject to these same problems, the most serious of which may be alternate bearing. Ideally, the pollenizer trees should have heavy bloom each year to ensure consistent fruit crops. This is a very significant factor in plantings where the grower has planted the minimum possible number of pollenizers. Growers must remember that insects are required to move the pollen since it is sticky, heavy, and the wind is not effective. Honeybees are the best pollinators available. One colony of bees per two acres, properly placed in the grove is recommended. The grower must avoid use of insecticides that are hazardous to bees during the bloom period (while bees are in the grove).

The bloom periods of the pollenizer tree and the trees to be pollinated must overlap as much as possible. It may be desirable to have both types on the same rootstock, if possible. The fruit crop on the pollenizer trees should be harvested as early as possible to help encourage bloom during the following spring. Fruit should be removed from the pollenizer trees, even if it is not to be marketed.

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Table 1. Compatible cross-pollination cultivars.

	Hybrid to be Pollenized						
Pollenizer	**Orlando**	**Sunburst**	**Page[3]**	**Nova**	**Osceola**	**Robinson**	**Minneola**
Robinson[1]	G	F-G	N	N	P	P[a]	-
Nova	VG	VG	N	P[a]	-	N	-
Page	G	-	P[b]	N	G	N	-
Sunburst	G[a]	P[a]	-	G[a]	-	G	VG
Osceola	G[a]	-	-	-	P[a]	P	-
Orlando	P[a]	VG	G	VG	VG	VG	N
Minneola	N	G[a]	-	-	-	-	P[a]
Lee[2]	VG	G[a]	G	G[a]	VG	VG	-
Fallglo[2]	-	G	-	-	-	-	G[a]
Temple[2]	VG	VG	G	VG	G[a]	VG	VG
* Adequate density and arrangement of pollenizers is required to ensure proper pollination (see Fact Sheet HS-170, Cross-Pollination Planting Plans for details). * Adequate honeybee population required to move pollen from pollen source trees to the hybrid.							
Key	VG = very good; G = good; G[a] = believed to be good, however limited data exist on this combination; F = fair; P = poor; P[a] = poor as a self-pollinator; P[b] = sometimes good, small fruit; N = not compatible						
	Areas left blank do not have sufficient data to state effectiveness as a pollinator.						
[1] = Limited pollen produced by Robinson. [2] = Varieties do not require cross pollination. [3] = Page may bloom before other varieties.							
Source: Dr. C. Jack Hearn, Retired Plant Breeder, USDA Horticultural Field Station, Ft. Pierce, FL.							