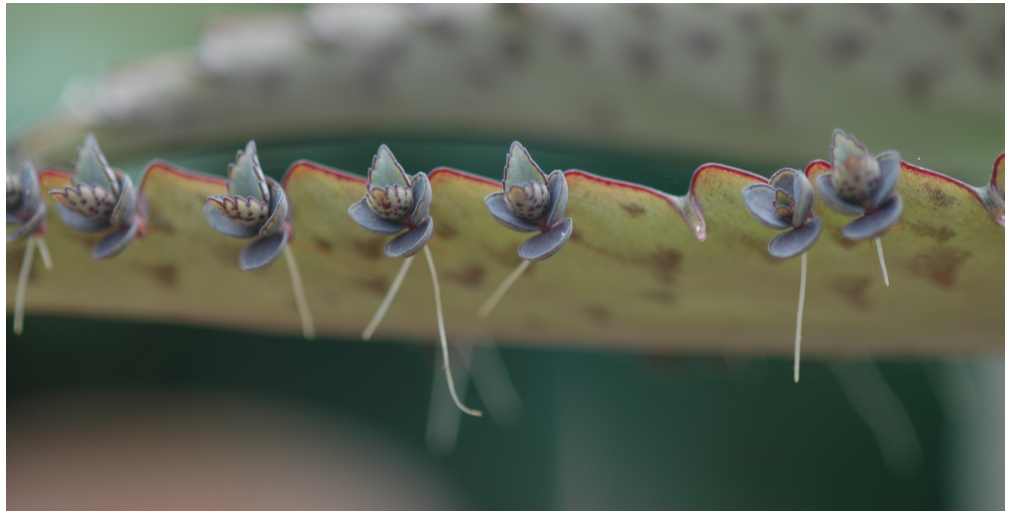


Plant the IDEA

Devil's backbone



Kalanchoe daigremontiana

(Raym.-Hamet & H. Perrier) A. Berger

Plant, the IDEA (Identifying Details of Educational Assets)

Encouraging interest in all things GREEN

Plant family
Crassulaceae

Common names

Mother-of-thousands,
Mother-of-many, widow's
thrill

Origin

Madagascar

Caution

All plant parts are potentially
poisonous, if ingested,
particularly to pets. Contains
daigremontianin, a cardiac
glycoside

Devil's backbone has been widely introduced into the United States as an easy-to-grow house plant. In the warmer areas of the country, *Kalanchoe daigremontiana* was planted outdoors and is now listed as an invasive plant.

It has elongated, succulent leaves that develop bulbils or plantlets on the margins when mature. Grown inside, the plant can reach two feet in height. The lovely pink to magenta pendulous blooms usually appear in February, though this may vary according to conditions.

Plant this IDEA in a well-drained potting mix and grow indoors in a sunny to partly sunny window. Give the babies away to friends, though it may be a challenge to have that many friends! Water it with regularity, though don't keep the soil too moist.

This plant can become invasive in its environment, due to the production of plantlets (via apomixis) along the leaf margins (see picture above). To avoid these problems, isolate it and make sure that the surface where plantlets fall can't support their growth.

Kalanchoe daigremontiana has a unique system of photosynthesis called Crassulacean acid metabolism (CAM), so named because of its discovery in plants of the family Crassulaceae. CAM photosynthesis is typically found in desert or arid-dwelling plants and is primarily a modification that increases the Water Use

Efficiency (WUE=carbon uptake/water loss) of the plant. Other CAM plants include orchids, bromeliads and agaves.

In CAM plants, stomates are open during the night and so the plant loses less water while still taking up CO₂. This CO₂ is fixed by PEP carboxylase to form oxaloacetate which is then reduced to malate. Malate is stored in high concentrations in the vacuole and then transported out of the vacuole during daylight hours to be decarboxylated to make CO₂. This CO₂, released within the plant during day, is fixed by Rubisco of the C₃ photosynthesis (Calvin cycle). Thus, the plant cell accumulates a lot of CO₂ in the mesophyll during daylight without ever having to open its stomates. In times of extreme drought, the plant can keep stomates closed while still photosynthesizing and manufacturing sugar, a kind of CAM-idle that cannot be kept up indefinitely. A spatial separation of the initial fixation/decarboxylation and subsequent fixation reactions occurs, made possible by specific anatomical features of the leaf (Krantz anatomy). However, the efficiency of the plant is increased by a temporal separation of uptake and loading of CO₂.

Dittrich, P. 1976. Nicotinamide Adenine Dinucleotide-specific "malic" Enzyme in *Kalanchoe daigremontiana* and Other Plants Exhibiting Crassulacean Acid Metabolism. *Plant Physiology*. 57(2):31-314.

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