

without any visible roots. Shoot growth of these plants developed immediately but by the end of the fourth week, most of these plants had lost their mature leaves and were dead.

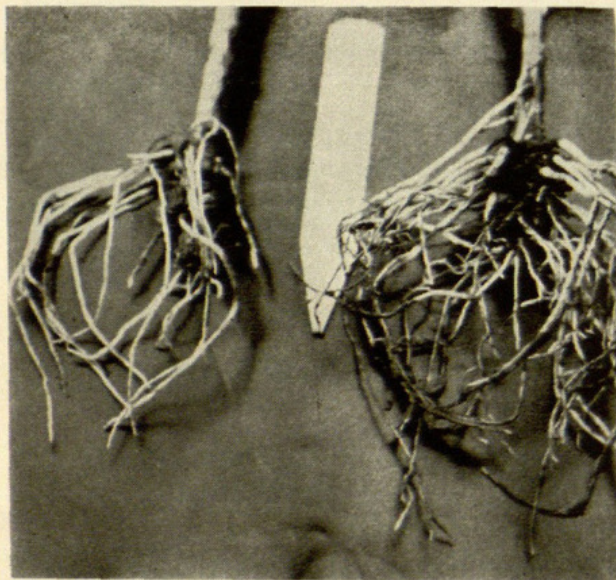


Fig. 3. A close-up of roots shown in Fig. 2. Examined eight weeks after transplanting, plant on left had no branch roots, while plant on right showed branch roots and top growth.

Photo by author.

Cuttings that were treated with 10 p.p.m. NAA developed substantial shoot growth one week after transplanting, although the mature leaves were lost by the fifth week. Only three of the plants that were air-layered with 100 p.p.m. NAA produced shoot growth after five weeks but ten weeks later, all of the plants still retained their mature leaves.

While there were no apparent differences in root formation when the plants were air-layered with white or black polyethylene film, the lower temperatures recorded when white polyethylene was used for wraps indicated that this color may be most favorable to use. Most air-layering is practiced in the spring and summer when air temperatures are high and when light intensities are strongest. As the maximum temperature for optimum root formation is approximately 85.0°F., white polyethylene film will keep the internal temperature of the air-layers nearer this optimum.

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This work was undertaken at Michigan State University.

HELLEBORES IN SOUTHERN CALIFORNIA

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MOST OF THE INFORMATION about the culture of Hellebores makes the average person afraid to attempt to grow them. There are many conflicting cultural instructions, most writers stressing the difficulties. Yet with the possible exception of *H. niger*, they are almost foolproof to raise. Planted in a humus type soil, given adequate water, good drainage and partial shade they will thrive. Most of the species are quite cold tolerant.

Now to disprove some of the "don'ts" in the culture of Hellebores.

They prefer a neutral soil; they can be balled and moved even when in bloom; the old leaves may be cut off to improve appearance. In fact, on some hybrids which have excessive foliage the leaves should be

thinned to let the blooms show. At the end of the blooming season, the foliage may be cut almost to the ground level for new shoots will soon come up.

The Hellebores will readily fend for themselves as a ground cover beneath trees and shrubs provided there is water and food. *H. foetidus* grows natively in hedgerows and thickets in rather dry soil. Superphosphate applied in late summer and again during blooming period will prove beneficial. At other times, a balanced commercial fertilizer will suffice. It takes several years for large clumps to develop, so divisions should be infrequent. Seedlings take from two to three years to bloom, while divisions taken after blooming or in late summer usually bloom the next season.

The entire clump can be dug and divided or small divisions taken off around the outside of the mother clump.

Most of the Hellebores will cut, some species lasting longer than others. The *orientalis* hybrids resent impalement on a pin frog in shallow water, a condition in which they wilt quickly. If the stems are burned or slit from the base upward along the stem before being placed in deep water, they will last for days. *H. niger* is perhaps the best keeper under most circumstances.

In the coastal areas where cold is not the order, *H. niger* is the least happy species in cultivation. Therefore, I would suggest caution in planting it in quantity. Most of the Hellebores sold as *H. niger* (in this area) are not that species but *orientalis* hybrids. The former is lower growing, the roots are black, the leaves are widest in the middle, the flowers are large, usually white and borne singly or at most in twos. The flower stem is never more than once forked.

The *orientalis* hybrids, *H. orientalis* (Lenten rose) are from mixed parentage and have considerable variation in size and form of leaf. They exhibit a great color range in blooms. The true petals are inconspicuous; it is the large broad sepals which form a corolla-like bowl that we speak of as the flower. Color may be white, pale green, pink, rose, purple or reddish mahogany. Many have curious dots or spots in them. A mature clump may be two feet wide and from fifteen to eighteen inches tall, carrying 50 to 100 blooms at a time. In the past, many hybrids were raised in Europe, particularly in France. Many named hybrids in separate colors were once available also. Most of these now appear to be lost, but as they grow readily from seed there are many possibilities for color variation. In order to buy a particular color, it is necessary to buy a plant in bloom or get a division of a known color.

Seeds set freely on most varieties and if this seed is allowed to fall to the ground at the base of the parent plant, remaining undisturbed, it will germinate by the following spring or early summer. These

seedlings should be transplanted early, for they send down a tap root. Germination of bought seed is apt to prove discouraging, for while fresh seed sprouts readily, older seed usually takes over a year to germinate.

While all the *orientalis* hybrids have attractive foliage, somewhat like eastern peony, it is really their bloom that is outstanding. For foliage, *H. corsicus* is the most valuable. This species has sculptured grey-green leaves, spiny on the margin and immense trusses of pale green bloom. Usually with us, it grows about three feet in height and somewhat more in width. From October until well into May, it bears flowers. Unless spent flowers are removed, the blooming season is apt to be curtailed. The plant sets many seeds which fall to the ground and which germinate readily. Old leaf stalks past their prime may be cut off to the base. This particular species is beautiful combined with *Mabonia bealei* and *M. lomariifolia*. It also makes a spectacular container plant. While it is more tender to cold than other species, it is somewhat more sun tolerant. Its native habitat is the Island of Corsica from sea level to mountain side. Even there, those growing along streams are the more outstanding.

Helleborus lividus is similar to the above but the leaves are not toothed and the stems are deeply tinged and mottled red. The flowers are more slate than green but unfortunately this species is not easily obtainable.

Another good foliage Hellebore is *H. foetidus*. The leaves are much more narrow, the flowers borne in profusion but inconspicuous because of their smallness and coloring. They are only about three-quarters to one inch wide, greenish with a pencil margin of purplish red. It is a native of England. A mature plant has an airy, shrub-like appearance.

At present, the supply of good hybrid Hellebores is not equal to the demand. This makes the initial outlay for them seem expensive; however, the future dividends of beautiful blooms and many plant divisions more than repay the cost.

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