

any excess water; they are then placed in paper-lined seed trays and dried on a greenhouse bench.

The same machine has been used successfully for threshing out seeds of *Laburnum* and *Carpinus*; it was also used with success for de-winging the fruits of *Acer campestre*. In all three cases the chaff was blown away by using a small electric fan; no doubt the chaff could be removed by flotation if one so desired.

## PROPAGATION OF LILIES

A. TURNER

*The Royal Horticultural Society's Garden  
Wisley, Surrey*

### PROPAGATION METHODS

Nature has provided many ways by which we can increase stocks of lily bulbs but the rate of increase by bulb division, as in *Lilium hansonii*, by bulblets below ground, as produced by *L. speciosum*, by the rhizomatous bulbs of *L. pardalinum*, or the stoloniferous bulbs of *L. superbum*, is far too slow for most of us. A few species and hybrids form bulbils in the leaf-axils at flowering time and, while these can be collected in quantity and grown on, the two main methods adopted for the propagation of lilies involve the use of bulb scales or of seed

**Scales.** That universally useful item—the polythene bag—has made propagation by scales so simple an operation that I need spend very little time in describing our method. We take our scales in late summer or autumn when the lifting and transplanting of lilies is normally taking place. We drop the scales into a polythene bag, shake them up with enough PCNB dust (Quintozene) to give them all a protective coating then add a mixture of equal parts of peat and sand, shake until the scales are thoroughly mixed with the compost, then seal the bag. It is essential that the peat / sand mixture is moist but not wet and that the bag is well sealed.

We store our filled bags under the staging in a glasshouse with a minimum night temperature of 50° F. and, in late winter and early spring, the scales having formed young bulbs are ready for spacing out in boxes to grow on.

**Seed.** The germination of lily seed has never presented many problems although for some species—and hybrids from them—a period of exposure to low temperatures is essential before germination will take place.

Some, and among these are *L. martagon*, *L. szovitsianum*, *L. canadense*, *L. superbum* and *L. japonicum*, exhibit hypogeal germination and have the annoying habit of showing no signs of growth

above ground in the first year although forming minute bulbs below ground

Our method of sowing seed of hardy lilies enables us to deal adequately with both of these types. We prepare seed beds in containers in the normal manner but after sowing do not top-off with compost. We use instead a thin covering of gravel chippings of  $\frac{1}{4}$  inch grade. The containers are then stood, or if small, plunged in a shaded position under the north side of a wall in the open air.

We like to sow our seed in autumn or early winter although this is not always possible as small packets of seed arrive from various parts of the world at various times throughout the year and these we try to sow as soon as received.

A regular check should be made lest germination takes place earlier than anticipated. Seed of *L. auratum* and *L. speciosum*, if harvested under our usual damp and cool conditions and sown immediately, can germinate very rapidly.

It is our practice to bring the earlier sowings into a warm glasshouse (minimum night temperature 50° F.) in late January or early February and then growth is soon visible on those not having hypogeal germination. Species known to have this trait are given about four weeks in warm temperatures then placed outside while the night temperatures can still fall fairly low; we find this treatment causes the timing mechanism of the young bulb to register the passing of a second winter and normal top growth appears in May or June, thus gaining one year's growth.

The use of chippings for topping-off has a number of advantages over other methods of sowing. The heaviest of rains cannot dislodge either seed or compost; moss, algae, and liverwort does not grow easily on the surface and, something of supreme importance, the seed cannot become waterlogged as air will always follow water down through the chippings to the seed which is kept in contact with but is not buried by the compost.

## GROWING.

**Composts.** It is not easy to specify a compost which is suitable for all lilies. We have in this genus a few which do very well in limy soils and, of these, *L. candidum* and *L. chalcedonicum* come immediately to mind; some thrive in peat (*L. japonicum* and *L. neilgherrense*) and many will do best under conditions between these two extremes. Lilies have, however, some requirements which they all share; they need sufficient humus in the soil to hold a reserve of moisture for them and they must have sharp drainage so that all surplus water rapidly drains away. The vast majority of them will do well in a compost that provides these conditions and is acid in reaction. Most of our loam has a pH of 5.5 and so we can provide suitable growing media by modifying



our John Innes composts, stepping up the peat and sand content slightly and omitting the calcium carbonate.

**Pricking-off and Potting-on.** Almost any reference book on lilies will state that the pricking-off of seedlings should be done with the utmost care as any damage to the root system may result in the death of the seedling. It is my experience that however carefully the work is done, the young bulb usually receives a check which causes yellowing of the foliage and the cessation of growth for that year. We, therefore, endeavor to avoid pricking off seedlings. The quantities of seed we handle are usually small; we sow thinly 6 or 8 seeds in a 3 or 3½ inch pot and as soon as the root system is strong enough, move the pot-ball complete into a 6 inch pot. This is usually in the first year of growth and by the end of the second year the bulbs can be shaken out and planted in the open ground. Some of the quicker growing species can be flowered in 18 months from sowing.

**Feeding.** We give an occasional watering with liquid fertilizer when the root system is strong enough to warrant this, using a feed with a 6N-6P-8K ratio, plus trace elements; we find this most beneficial, especially with slow growing types like *L. szovitsianum* which otherwise would remain for a long time in seed compost with very little nutrient available.

**Disease Control.** The foliage of young lilies should be protected throughout the growing season from attacks of *Botrytis*; *B. elliptica* and *B. cinerea* can cause complete collapse of the foliage and end growth for that season. The old established method of control—Bordeaux mixture—is still much used. More recently Benlate has been used experimentally with good results.

Basal rot, from *Fusarium oxysporum*, is a major risk with many lilies young or old; only *L. henryi* and its hybrids appear to have any real resistance. Sterilized soil, a clean water supply, the prompt removal of any diseased material, and dusting the bulbs with PCNB whenever they are handled are, at present, the best means of control. Benlate is proving useful in the control of basal rot of narcissus and of bulbous iris; it may also be found to be helpful with lilies.

Virus diseases should not be present in seedling lilies and strict control of aphids should keep them free from virus infection. Pirimor is proving useful in this respect.

Finally, may I say, that I fully realize that the methods we use at Wisley for our small quantities of seed may well be impracticable for larger quantities but my experience convinces me that root disturbance in the first year must at all costs be avoided and even if seed is sown in boxes or beds, a liquid fertilizer with high potash will give better results than pricking-off