

Gally Gaskins: With a large calyx.  
and many others, collectors items, all.  
Still the work goes on by patient pollinators, to mention a few:

Jared Sinclair, heir to the Florence Bellis collection.  
Our own: Noel McMillan, with his strange char-  
treuses, grey blues, and others.

And even from Japan, brilliant colours, once again mostly for pot work and not long-lived. I wonder what "Will" S. would have made of them for his were "faint and pale".

"Perchance in pair of glassed 'sun'  
their brightness maketh my eyes to run".

## REFERENCES

- Shakespeare, W.  
A Midsummer Night's Dream, II ii 249  
A Midsummer Night's Dream, I i 3  
The Tempest, V i 88

## POLYANTHUS PONDERINGS

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I will restrict this paper to areas that will be most useful for people having a go at producing polyanthus (*Primula* × *polyantha*) from seed and, judging by last spring supplies, must number thousands.

## SEED GERMINATION

Polyanthus seed is very expensive to produce and likewise to purchase. To pay, one must maximise germination rates. I find that no matter the size of the seed or the rate of germination, the resulting plantlets always grow to presentable plants. The main factor affecting size of plants is the type of growing season in the autumn and how long this lasts. Planting dates do not seem to matter as much, but there is an optimum time to allow for the vagaries of the weather. We find early summer, November to December, with a preference for the second week in December, is best for us. This allows sufficient time to mature seed and avoids a bottleneck of freshly germinated seedlings waiting to be pricked out when the staff and family are away for Christmas vacations. A further planting is done in fortnightly batches to the end of

January in order to spread the work of pricking out.

Most of the older strains of polyanthus were planted in spring — October to November, because of their growing requirements and, at this time, conditions are less critical for success in germination. Because we plant later, the January/February sun can create problems for plants that do best under cool conditions; 18°C. is about the limit for good seed germination so conventional glasshouse conditions need to be avoided.

Having bred and sold the seed we produce, it is necessary for us to know what to expect with each year's batch. The method we use is to plant in a normal seed sowing mix of peat and sand. Flats are levelled and drenched with Thiram. Seed is row sown across the flat — a preference we have in case there are any hold-ups when pricking out. The seed is anchored with a light covering of vermiculite, No 2 if available (No 3 will do). This merely creates an environment around the seed and doesn't cover it completely.

Flats are then stacked in double rows to allow light penetration from one side, and placed in a cool, shady draught-free spot. To maintain moisture levels, the stacks are dampened every couple of days. The top flats are covered, as they dry out the quickest. The exposed edges do tend to dry out if not watched. After eight to ten days the rising seed coats can be seen, and the flats are then unstacked, and the seed given a full cover of vermiculite to anchor the seed firmly.

The flats are then re-watered and transferred to the coolest covered house we have, i.e. top cover shade cloth sides. Normal maintenance follows and once a good mat of true leaves has developed, the flats are transferred to under 50% shade cloth to await pricking out.

Our routine might appear labour intensive but we are trying to maximise germination with the facilities available. Critical points are:

1. Allowing light for germination.
2. Checking stacked flats to avoid seedling elongation after germination.
3. Anchoring plants after striking.
4. Preventing drying out at any stage.
5. Keeping temperatures below 18°C.

We have been producing polyanthus and cyclamen seed for many years. The beginnings of our polyanthus strain goes back to the American firm of Vetterle and Reinelt, whose strain was known as the "Pacific Strain". When this firm changed from the original principals, a New Plymouth nurseryman, Alex Purdie, received some seed from one of the

principals who was a good friend of his. Alex knew my brother and I were trying to breed polyanthus and passed the seed on to us saying "I think you'll find this interesting". From a series of self-pollinating and selecting, our present strain has developed.

The Pacific Strain is known for its range of colour and it has been our aim to extend this, particularly to the ruffles Picotee and unusual combinations. Where colours have weakened, further strains have been added and selected from. Each year we try to emphasize a particular characteristic. Vigour and colour come first, but in some seasons we have concentrated on disease resistance, heat resistance, size of flower, and strength and length of stems, multi-stems, and flower weathering. The plants selected have to pass these criteria before they are used in the breeding programme.

Introducing new forms into the strain follows Mendel's laws, but the main difficulty producing seeds of new cultivars in a small business is that one has to remain profitable while all the development takes place. Rejects have to have commercial value and this is not always possible. Hand crossing only is carried out between our strains and this is very time consuming.

The main difficulty we face in the humid Waikato area is keeping the plants free of botrytis during the breeding season. We always cut off the stigmas to avoid seed pods going off and the plants are sprayed regularly.

There is no doubt selecting a type of plant and trying to improve it is a very interesting and worthwhile project for a young person to take up, but in your interest I humbly suggest you select plants that can be named individually and thereby come under the terms of the Plant Varieties Act. "Personal satisfaction" has little collateral value in the eyes of a bank manager.

### SOME DO'S AND DON'TS OF PLANT BREEDING

1. Do have a plan or set of objectives — one that does not need a computer to maintain it. It is very easy to get distracted from your original objective.

2. Ensure the vigour of your strain and, if possible, produce an  $F_1$  for sale.

3. Do not get upset when people criticize the results of your years of work. No strain is perfect for every climate or situation. I notice strains that head ours in some areas do poorly in our climate.

## WHAT OF THE FUTURE

The trend at the moment is toward the compact plant for pot culture with the emphasis on a range of set defined colours. We have to recognise these trends and so have started this season to add greater uniformity to our strain, a factor we have been unable to do to date without sacrificing colour. By crossing selected cultivars of ours with acaulis, this should produce some interesting F<sub>1</sub> results for us. There remains much to do. It is no easy matter to compete with the best the world has to offer, but it's quite a challenge to try.

### PROPAGATION OF THE CORDYLINES BY VEGETATIVE MEANS

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Traditionally, *Cordyline* propagation in New Zealand has been by seed germination. This technique has been most satisfactory for general *Cordyline* production, and will continue to be so for species production.

However, with the increasing number of New Zealand cordyline cultivars worthy of clonal propagation appearing — and with the added problem of hybrid pollution, causing frustration with some species, particularly *Cordyline kaspar* and *Cordyline baueri* (from Norfolk Island) — vegetative propagation is becoming increasingly more attractive.

In addition to seed, cordylines can also be propagated from large cuttings and chips of bark. Micropropagation is also used on some species. However, each of these techniques has its problems. Large cuttings have a high failure rate and are highly destructive to stock plants. Bark chips have exactly the same problem. Micropropagation has been a failure with variegated *Cordyline australis* 'Albertii,' and has not yet been successful with *Cordylines kaspar*.

However, a few years ago some Japanese visitors to this country introduced a vegetative method that is proving satisfactory in a number of nurseries. This method requires the severing of the underground stem of a mother plant — as in Figure 1. The mother plant is removed from its container and severed in the middle of the mass of roots; leaving half of the roots on the mother plant, and the other half on the severed basal stem. The mother plant is then re-planted in fresh potting mix and kept well watered for a few days to minimise stress. The mother plants will then develop a new under-