Information

Horticultural Consultants
Weggs Farm
Common Raoad
Dicklaburgh, DISS
Norfolk IP21 4PJ
Tel: 01379 741200
Fax: 01379 741800
Email: info@dovebugs.co.uk
www.dovebugs.co.uk

Bud Initiation of Rhododendrons and Azaleas

Introduction
Work on the bud initiation of rhododendrons and azaleas has been carried out over a long period. The initial work was carried out in early 1960 and more recently work has been carried out at HRI Efford in the UK. It has concentrated on three basic processes that can be carried out on rhododendrons to achieve an increase in flower bud set. This involves the addition of growth regulators to reduce extension growth and encourage bud formation, the manipulation of nutrition and the use of supplementary lighting during the bud initiation process.

Flower bud initiation and development timing
In *R roseum elegans* that were studied, the shoot tip of the new growth comprised of a terminal meristem enveloped by cataphylls. The buds appeared in the axils of the cataphylls from 25th May to 10th June and by 14th June the shoot tip had developed as a floral axis. The timing of axillary bud formation was considered to be the transition period from the vegetative to the floral stage because the terminal bud began to initiate floral parts only after axillary buds were produced. The axillary buds developed sepals, petals and stamens by 14th June and it was observed that the formation of axillary buds preceded floral initiation.

Axillary buds enlarged and developed rapidly and were equal in size and development by 12th July to the terminal buds. The rate of growth did not differ between terminal and axillary buds thereafter. Carpels were first observed on 9th August, about 3 weeks after the initiation of the perianth and stamens. Ovaries were formed by 23rd August and ovules appeared as protrusions on the placental margins on 6th September. Ovules remained small and only partially differentiated until the following spring. Stamens, which had been undifferentiated and had developed relatively slowly compared with petals and carpels, began to grow and develop rapidly after 9th August and were fully differentiated into filament, anther and locules by 23rd August. Flower buds showed divisions on 20th September and pollen tetrads on 4th October. From mid October until the onset of dormancy the significant changes observed in the flower buds were:

1. enlargement of floral parts, especially style and stigma
2. development and accumulation of anthocianin pigment in the petals
3. thickening of tetrad pollen walls.

The plants were all dormant from 23rd December to 11th April.

After 15th April the flower buds enlarged rapidly. Ovules, which were relatively small and undifferentiated, enlarged and differentiated into their constituent parts by 25th April. Cell division

continued to form an embryo sac containing an egg cell, synergids, nuclei and antipodals. Flower buds sampled after 2nd May had complete embryo sacs. Full bloom occurred on 15th May.

Supplementary lighting

Work done in Ohio State University showed it was possible to obtain budded plants from rooted cuttings in one year, which demonstrates the degree to which the manipulation can be carried out. The initial supplementary light treatments were from 10 a.m. until 2 p.m., using only 100 lux, which is equivalent to a 100 watt incandescent bulb, 1.2 m apart and 1.2 m above the plant.

The second trial included 200 lux supplementary lighting from 1st June to 1st September, which enhanced the flower bud count on all treated plants.

Growth regulators

Trials using B-Nine and Cycocel proved that these two products provided an increase in flower bud initiation and development. Cycocel applications reduced stem elongation resulting in shorter plants and a more spreading nature. Very little growth regulation was seen on B-Nine treated plants but bud initiation was enhanced. Applications of both B-Nine and Cycocel should be made when the leaves start to expand on the elongated shoots. A follow-up application is made two weeks later to expanded, but immature leaves. Growth flushes are induced by pinching all the terminal buds on the plant as the buds mature. Terminal bud production is increased by both B-Nine and Cycocel applications. The most satisfactory results came from an application of Cycocel at 3g/lt plus 0.5% B-Nine although application of Cycocel only has proved successful at 6g/lt on some varieties.

Nutrition

Research has shown that high levels of phosphorus increased flower bud formation by adding 28g of single super phosphate as a top dressing to a 5lt container. A slow release fertilizer, Enmag, can be applied at 35g to a 5lt container, or Polyon coated mono-ammonium phosphate at 12g per 5lt container. The 4-5 month product should be chosen to achieve the period of phosphate release that is needed. Additional liquid feeding can be given at the rate of 800ppm P_2O_5. This is achieved by using 160grms/litre mono-ammonium phosphate injected at 1:100 or Peters 10:52:10 at 155grms/litre injected at 1:100. This should be started in May and given at monthly intervals until September. The summer application timing of phosphorus is important. Phosphorus applied during the summer results in a three-fold increase in the foliage phosphorus levels and additional phosphorus results in over a three-fold increase in growth.

The tissue analysis figures which have been established can be used as a guide to mid season nutrient values. This also shows the value of trace elements in flower bud formation.

	% dry weight				ppm dry weight						
	N	P	K	Ca	Mg	Mn	Fe	Cu	B	Zn	Al
Healthy plants	1.84	0.22	0.48	1.39	0.19	1260	138	3	33	29	106
Poor plants	1.78	0.18	0.62	1.15	0.27	637	59	2	30	38	66