and sprayed the paths regularly.

To combat *Botrytis* we introduced a routine fungicide spray using Captan and Benlate every 10 to 14 days. With the high temperatures and humidity this was a constant danger. Within 8 to 10 weeks we had achieved around 70% rooting, the trays were removed from the polythene tunnel, and all cuttings allowed to harden off outside.

We air-freighted our first shipments to England of 2000 rooted cuttings in June, 1982. These cuttings were ready earlier, but we decided to wait until temperatures and light conditions were at their best in England, with equally cool conditions in Kenya. After passing the necessary Ministry of Agriculture health checks we had the cuttings back on our nursery 18 hours after their shipment from Nairobi. They were all potted into 7 cm pots within 24 hours, placed in a closed polyhouse and covered with a sheet of white papronet.

The cuttings had made no new growth from the moment we had taken them in January/February until their arrival in England in June. Within 2 to 3 weeks of potting we noticed new root movement and this was quickly followed by 2 to 3 in. of fresh shoot growth.

We experienced a minimum of loss in nearly all cultivars, the exceptions being ceanothus and × *Cupressocyparis leylandii* 'Castlewellan'. By late spring the following year we had well established liners ready for resale or potting on.

THE GENUS *PIERIS*: ITS PROPAGATION AND PRODUCTION

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Pieris belongs to the family Ericaceae and, like other members of the family such as *Kalmia* and *Rhododendron*, they thrive in light shade and do best with a cool, moist root run. Whilst perhaps not the choicest of evergreen shrubs they do offer a distinct ornamental quality for acid soils.

The most distinctive feature is, of course, the colour of the young growth. This can vary from brilliant red to pink, as well as creamy yellow, bronze, or copper. The flowers which are usually white, but sometimes pink or red, are lily-of-the-valley shaped and born profusely on racemes or panicles. Various species and hybrids flower in the garden from February to June. The flower buds, which are formed in late summer are

also attractive during the winter months, particularly those of a bronzy colour.

Most plants are very compact in growth habit, making dense, shapely bushes up to 2 × 2 metres. *Pieris formosa* var. *forrestii*, however, will grow up to 4 metres. Dead heading of old flowers is beneficial. This removes the unsightly dead flowers. Improved growth will result, giving better flowering the following season. This task is best performed with secateurs as the dead flowers are not easily pinched out.

The genus is fairly small containing only a few species, and perhaps only two of these are of real commercial importance.

These are: (1) *Pieris formosa* var. *forrestii*, native to the Himalayas, and (2) *Pieris japonica*, native to Japan. Of much less importance are *Pieris floribunda* from North America and *Pieris taiwanensis* from Formosa. There are, however, some hybrid groups, one of which is very important commercially. This is *P. formosa* var. *forrestii* × *P. japonica*. Hybrids of less commercial importance are: *P. floribunda* × *P. japonica*, and *P. taiwanensis* × *P. japonica*.

Production Sequence. July-Dec. 1984. (cuttings rooted); March 1985. (potted off in 9 cm container); Jan.-Feb. 1986. (potted on into 2 litre container); Sept. 1986 to March 1987. (marketed).

Source of cutting material. a) From stock plants planted outside in a sheltered and/or protected site, as young growth is subject to late spring frost damage. b) From young stock or liners in the nursery. Many of the liners need to be cut back to encourage bushy growth and this material can be used for cuttings.

Time of year. Cuttings can be rooted any time between June and December. In most seasons *Pieris* will produce two flushes of growth. Even if the early spring growth is frosted, new shoots will appear after 2 to 3 weeks. Cuttings can be taken after the first flush has hardened in late June or early July. Alternatively, cuttings can be taken from September until December after the second flush has hardened. In my experience more cuttings are available from the second flush. These root more consistently and fewer flowers are formed on the stock plant to inhibit next year's growth.

Type of cutting. A 6 to 10 cm nodal tip cutting is taken. The lower leaves are removed and the terminal cluster reduced to 4 to 6 leaves depending on their size. With *P. formosa* var. *forrestii* cultivars the leaf size can be reduced to facilitate insertion of cuttings. Wounding of the cuttings is beneficial to

rooting if the wood is reasonably hard — a 1 cm long basal slice wound is given.

Treatment. Hormone treatment is beneficial to rooting and, in the past, 0.8% IBA in talc has been used. However, last year excellent results were achieved using 2500 ppm IBA and NAA as a 5-sec. quick-dip.

After care. Forty to fifty prepared cuttings are inserted per standard seed tray, the number depending on the size of the cuttings. The cutting compost used is a very open one, as most standard seed trays are poorly drained. The compost is 2 parts perlite to 1 part moss peat. The larger trays with mesh bases now available are much better for economical heat transfer. The larger trays with mesh bases now available are much better for economical heat transfer. The trays are placed on a mist bed. The mist is operated automatically up to mid-or late October and manually thereafter. The basal temperature is 21°C. One must ensure that the compost in the base of the tray does not dry out when the mist is operated manually. This is critical at the point where cuttings are starting to root. If the trays tend to be dry then give them a thorough soaking. Cuttings usually take 5 to 8 weeks to root and should then be overwintered in the trays.

Growing on. Flowers or shoots which form on the cuttings whilst in the cutting trays should be cut out in the dormant season. Ideally the rooted cuttings should be potted off just before they break into growth; 9 cm. containers are used and they are potted into an ericaceous compost containing a slow-release fertiliser. They are then placed pot thick into a cold dutch light structure to be grown on.

In the autumn the liners are pruned back fairly hard to encourage bushy growth and the best material from these prunings can be used for cuttings. *Pieris formosa* var. *forrestii* cultivars and *Pieris* 'Forrest Flame' will not produce bushy plants unless cut back. In the main, *Pieris japonica* cultivars are naturally more bushy and therefore it is easier to produce a shapely container plant. Any flower panicles present should also be removed at this time.

In the following late winter the liners are graded and only first grade ones are potted on into 2 litre containers. Second grade *P. formosa* var. *forrestii* 'Wakehurst' and *P.* 'Forest Flame' are usually left in the 9 cm containers and potted on later in the year, or with the following year's crop, as demand for these is usually good. Second grades in the other *Pieris* are usually thrown away. After potting they are placed pot thick in a cold dutch light structure. After the first flush of growth has hardened, usually in early June, they are moved out onto

sand beds in a twin-span netting-covered structure, where they are placed with suitable spacing.

Weed control. Directly after potting in January or February Napropamide and Simazine are applied to the containers through the irrigation system by means of an internal bag type dilutor. Half rate of the herbicides are applied. This is 5 liters c. p. per hectare. The liners are also treated this way directly after potting off in March. It is best to water the herbicide in after application. Then when the plants are moved out to the twin-span netted structure and placed on the sand beds Oxadiazon granules are applied at 200 kg/hectare.

Growth regulators. Sometimes some *Pieris* plants make a late flush of growth in October which is usually killed by the first frost. This year Alar is being tried to prevent such late growth. Application is made after the 2nd flush has hardened up; at the rate of 2500 ppm.

Marketing. This is from late summer onwards, the majority of plants being sold the following spring, just before they come into flower.

Selection of species and cultivars.

Pieris 'Brouwers Beauty', (*P. japonica* × *P. floribunda*). This is worth trying as it is extremely hardy and has more attractive flowers than *P. floribunda*.

Pieris 'Forest Flame' (*P. formosa* var. *forrestii* × *P. japonica*). This is well known and deservedly one of the most popular *Pieris*. However, another *Pieris* of the same parentage, 'Tilford' should be grown more. It has bright-red, young growth which breaks out late after the frosts and is a more compact bushy plant.

Pieris formosa var. *forrestii* 'Wakehurst'. This is the most widely grown clone, but two relatively new ones worth growing are: 'Balls of Fire' (like a compact 'Wakehurst') and 'Rowallane' (for its yellow new growth).

There is now a glut of *Pieris japonica* cultivars available when one looks in Continental, Japanese, North American, New Zealand and English catalogues. At least 35 are known to me and whilst it is impossible to assess all of these properly, the following are some of my favorites:

P. j. 'Blush' — pale pink, nice foliage.
P. j. 'Pink Delight' — good strong pink.
P. j. 'Valley Valentine' — good red flowers.
P. j. 'Mountain Fire' — brilliant red young growth.
P. j. 'Little Heath' — small compact variegated clone with lovely pink colourations in young growth.
P. j. 'White Rim' — lovely cream variegation.
P. j. 'Dorothy Wyckoff' — good white flowers, bronze winter buds, and

superb dark foliage.
P. j. 'White Cascade' — long racemes of white flowers; good grower.

Pieris 'Grayswood', (*P. japonica* × *P. taiwanensis*), often sold in the past as *P. taiwanensis*, a superb plant with long racemes of white flowers, dark winter buds, and coppery young growth. I believe that this should be much more widely grown.

Pieris 'Purity' is another of my favourites, placed at the end because in my mind there is doubt that it is a true *P. japonica*. It looks like a compact *P. taiwanensis*. However, it is far superior, with a profusion of erect white racemes in March or April.

Pests and diseases

a) *Vine weevil*. Easily controlled by incorporating Aldrin dust into the compost at the rate of 2 Kg c.p. per 1.3 cu. metre.

b) *Red spider*. This is only troublesome where plants are grown under glass or polythene protection. Spray with Plictrant 600F as soon as mites are observed.

Apart from the above, *Pieris* plants are remarkably free from pests and diseases.

CONCLUSIONS

I feel that this crop is well worth growing as it presents a challenge to the nurseryman. Good cultural practices are required in order to produce a dense, shapely plant with plenty of flower buds for spring sales. Alas, not enough plants of this quality are seen. The production of larger plants in containers up to 10 litres also presents a challenge. The production of quality plants and marketing at the optimum time should increase sales of this beautiful genus.

PROPAGATION AND PRODUCTION OF *GARRYA ELLIPTICA*

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Garrya elliptica is listed as one of the most difficult plants to propagate, and many growers are reluctant to attempt production because of the numerous problems which can make it an uneconomic proposition. However, it is possible to overcome these problems with the equipment and facilities now available, and to achieve successful propagation.

The most important cultivar grown in Great Britain is the