

Estate, Glasshouse & Field Research Unit

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The Estate, Glasshouse and Field Research Unit fulfils the fundamental and crucial rôles of producing and maintaining plant material for the Institute's scientific research and contractual undertakings. A wide variety and large number of plants are made available throughout the year for work both in contained/controlled environments and in the field. The landscaping of amenity areas within the various sites and the maintenance of all estate and field boundaries are additional responsibilities.



The Unit has 24 staff and provides a fully equipped and professionally expert service to fulfil the requirements of its clients with regard to the preparation of land, growing medium, sowing, drilling, planting, propagation, plant maintenance, harvest and clearance of residues for the Institute's field and glasshouse research objectives. It may have responsibility for an entire package from start to finish, or can provide prepared land and/or controlled environment régimes for inputs to be undertaken in varying degrees by scientific clients.

The work undertaken spans sub-cellular to whole-plant aspects within the range from high-technology research on the genetic modification of plants, virus manipulation and testing; vegetation dynamics, bioremediation, woody perennials, fibres and biomass; defining data parameters for deriving mathematical models of crops; through studies on the effects of nutrient, pest, disease, weed environment on crops; to 'traditional' variety trials and maintenance of germplasm and nuclear stocks.

Within the controlled environment and glasshouse facilities, more and more accent is being placed on

molecular/cellular/GMO/transgenic work and, as a consequence, on the specialist protocols and facilities required to undertake this type of work. A new research glasshouse complex, with varying degrees of containment provision and sophisticated environment control, came on stream during the year.

The range of plant material handled by the Unit, in both glasshouse and field trials, continues to increase. It includes cereals (winter and spring barley/oats/wheat), field bean, grass, clover, forage brassica (swede, turnip, kale, rape), oilseed rape, potato, blackcurrant, cane fruit (raspberry, black- and hybrid-berry), strawberry, *Lilium*, *Narcissus*, novel fruits (blueberry, cranberry, *Rosa spp.*, sea buckthorn, *Sambucus*), fibres and other industrial crops (hemp, reed canary grass, *Miscanthus*, nettles, lupins, willows), reserve collection of top fruit stocks (apple, pear, plum, damson), breeding programme apple selections, mixed tree species windbreaks and woody perennials, *Rubus* and *Ribes* nuclear stocks of germplasm, cassava, coffee, groundnuts, maize, and a miscellany of virus-indicator/screening species test plants.

The Institute has 172 ha of free draining, loamy soil at Mylnefield, Gourdie, and Pilmore Holding/Lonsdale. The land rises from 15 m to 140 m elevation, faces south to south-west and is exposed to westerly winds. Windbreaks of both hardwood and conifers are planted at intervals across the prevailing wind track. Each year, more than one third of the total land area is used for experimental crops, and trials are also carried out at other off-station sites. The general crop husbandry is based on a long-term (15+ years) plan of land use and is consistent with good practice and sound business management. Unless otherwise specified by experimental requirements, the land is maintained at pH 6.5, high P and K status, not deficient in trace elements, no evidence of previous trial cropping, free from perennial weeds and volunteer crops and, as far as possible, free from soil-borne pests and diseases.

Land is divided into packages of approximately 10 ha, providing areas for arable (annual) crop trials with a 5-year break between crops of the same type, and soft fruit (perennial) trials with a 6-year break. Smaller isolated/designated areas of land are provided for specialist requirements. The Unit is equipped with a range of

up-to-date field, experimental plot and glasshouse machinery to fulfil the work programme, and machinery can be modified as necessary in the workshop to suit the requirements of plot work. Water for field irrigation is provided from boreholes through underground ringmains with hydrants every 100 m. There are crop drying, handling and storage facilities.

The Unit maintains virus-free nuclear stocks of *Rubus*, *Ribes* and *Fragaria*. The *Rubus* and *Ribes* collection, which contains over 100 cultivars, is the basis of commercial production within the UK and a source of healthy plant material for research and commercial organisations world-wide. It is continually augmented by new cultivars and seedling lines from the HRI, SCRI, and contracted clients' breeding programmes.

The 11,000 m² of heated glasshouses provide fully automated services for all-the-year plant production which now exceeds 500,000 units annually. Glasshouse cubicles range in size from 12 m² to 350 m², providing specialist support for the varied research packages and for specific purposes including quarantine and isolation. In addition, there are 5000 m² of cold glasshouses, polytunnels and net structures.

Facilities for growing plants under controlled temperature, light and humidity regimes range from small 300 litre cabinets to large walk-in rooms. During the year, two new 600 litre tissue culture and seven 1000 litre growth cabinets plus four large growth rooms were provided in the header house area of the new research glasshouse complex.