Mass propagation of chrysanthemums by tissue culture

LARGE quantities of planting materials are needed to mass produce chrysanthemums (Fig. 1). If planting materials are scarce, new chrysanthemum plants may be produced by means of tissue culture.

Effectiveness

Tissue culture is a rapid method of mass propagating planting materials which are free of diseases.

Protocol of tissue culture

The following are the steps involved in tissue culture.

Initiation

With shoot tips as explants, use solidified Murashige and Skoog (MS) basal medium enriched with 1 mg/L benzyladenine (BA), 0.5 mg/L naphthalene acetic acid (NAA), 10% coconut water (CW), and 2% sucrose.

Propagule multiplication and rooting

Multiply propagules by repeated subculture, using two-node cuttings in MS solidified medium supplemented with 1 mg/L BA, 0.5 mg/L NAA, 10% CW, and 2% sucrose. To have induce roots from the plantlets, inoculate the microshoots in MS medium with 2% sucrose (Fig. 2).

Fig. 1. Chrysanthemum, a profitable crop for domestic use and for export.
Acclimatization

Acclimatize the plantlets using a combination of coconut coir and sand. Plant them in plug trays. Keep them in a greenhouse with reduced light intensity, and maintain a suitable relative humidity.

Establishment of mother plants

Establish hardened and acclimatized plantlets as mother plants, to mass produce rooted cuttings. Take good care of the established mother plants, to produce vigorous, healthy and clean cuttings. To keep them completely vegetative, give them a long-day environment, provide high levels of nitrogen, and remove shoots as soon as they are ready for harvest, leaving 2-3 leaves on the shoot where the cutting is removed. The number of leaves, brittleness, and diameter of the stem should be checked before the cutting are harvested. Ideally, cuttings which are harvested should be 6-8 cm long, and have four elongated internodes. The stem should be 3-4 mm in diameter when snapped.

Rooting

Clean the rooting media of soil-borne pests. Control soil-borne pathogens with 5-10% chlorox. Wash thoroughly with water. Prepare rooting media, which should be 6-8 cm thick and fine on top. Raised benches make cultivation easier, and protect the cuttings from soil-borne diseases. The ideal planting distance is 3.5 - 4 cm apart at a depth of 1.5 - 2 cm. The temperature in the rooting greenhouse should be 16°C - 18°C with 80-90% relative humidity. Control the temperature through ventilation and shading. During cooler months, the cuttings take longer to root.

Proper management of rooted cuttings

Mist newly planted cuttings 3 - 4 times a day. Three-week-old cuttings should be given less water, to avoid soaking and rotting. Control white rust and rotting by avoiding watering late in the afternoon, and by spraying fungicide with a spreading agent every 3-7 days, depending on the severity of the disease. Control aphids, leaf miners, thrips and mites through sanitation, mechanical, biological and chemical control measures.