entirely valid, a 75 kg propagator would need to ingest something of the order of 75 gm of NAA to reach this dose. Made up as a 1000 mg/l solution he or she would have to drink 75 litres of solution. The rooting hormones deserve to be treated with respect but seem not to present any great danger to the careful user.

LITERATURE CITED

1. Chong, C.A. 1981. Influence of high IBA concentrations on rooting. *Proc. Inter. Plant Prop. Soc.* 31:453-460.
2. Dick, L. 1982. An introduction to modern nursery stock production. Frederick Muller Pty. Ltd., London.
3. Dirr, M. 1981. Rooting compounds and their use in plant propagation. *Proc. Inter. Plant Prop. Soc.*, 31:472-479.
4. Hartmann, H.T. and D.E. Kester 1975. Plant Propagation: Principles and Practices, 3rd ed. Prentice-Hall, Inc., Englewood Cliffs, New Jersey.
5. Howard, B.H. 1974. Factors which affect the response of cuttings to hormone treatments. *Proc. Inter. Plant Prop. Soc.*, 24:142-143.
6. Mahlstede, J. and E. Haber 1957. Plant Propagation. John Wiley and Sons, New York.
7. Stanley, J. and A. Toogood 1981. The Modern Nurseryman. Faber and Faber, London.
8. Stecher, P.G. (ed.) 1968. The Merck Index. Merck Index. Merck and Co. Rahway, New Jersey.
9. Woods, E.A. 1981. New horizons in rooting compounds. *Proc. Inter. Plant Prop. Soc.*, 31:116-118.

SOME PRINCIPLES OF GRAFTING FOR THE PRODUCTION OF WEEPING TREES

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Plants may be grafted in a multitude of ways for many different reasons, but grafting is usually employed for one of the following reasons:

a) To propagate plants which are difficult to propagate by cuttings;

b) To join plants, the roots or shoots of each being selected for special purposes such as disease resistance and/or adaptability to special conditions such as soil or climate;

c) To invigorate weak plants, or repair damage;

d) To allow one root system to support more than one cultivar;

e) To produce clonal material usually on more vigorous rootstocks than itself; and

f) To eliminate problems of structure, growth, and disease.

Grafting is widely used for the commercial production of fruit trees and a variety of other ornamental nursery lines derived from clonal selection. These include flowering fruit trees, elms, ashes, liquidambar, etc.

Grafting is also widely used to create "special effect" plants that could not otherwise be grown to display their best features. These "special effect" plants include most of the weeping trees. Most of the weeping trees can be readily grown from cuttings or seed but produce plants with a prostrate or near prostrate habit. By grafting these prostrate plants onto upright stems (standards) of varying heights, plants with weeping habit can be produced which can cater for a variety of landscape situations.

The production of rootstocks for weeping trees should be given careful consideration. The practice of using seedling-grown plants as rootstocks for weeping trees does not always give the expected results when grafted to cultivars of the same species. The reason for this can often be traced back to incompatibility with some of the seedling rootstocks. There are many examples of this where seedling rootstocks grafted to another cultivar will behave quite differently. When only small numbers of grafts are made in one season the reasons for these failures are often obscured, being attributed to faulty techniques or bad seasonal conditions. The reasons are usually more apparent when large numbers of grafts are made.

One method that overcomes these failures is to use an intermediate stock which has proven to be compatible with both rootstock and scion.

The usual rootstock is planted then grafted with the intermediate stock of a selected proven clone which is grown for one season or until the desired height is obtained. It is then grafted or budded with the prostrate or weeping clone. This method has proved very satisfactory and, provided care is taken with the grafting, 100% success can be achieved.

By using the intermediate stock system to produce stocks for some species of weeping trees it is possible to obtain a good straight stock 2 to 3 metres high without bends or knots in one growing season. This total approach has allowed salable plants to be produced 12 to 18 months earlier than by using the conventional method.

When carrying out the actual grafts it is best to use graft-

ing knives of the highest quality kept as sharp as possible at all times. Whenever a knife is felt to "drag" or leave marks on the cut surface it should be re-sharpened. I find the most useful grafting knives are the ones with slightly curved edges.

With most types of deciduous weeping trees I use the "whip and tongue" graft. The length of the flat sloping cut is made approximately six times the thickness of the scion. The cambium layers of at least one side of the graft should be perfectly aligned. The grafting tape is left on the graft until the scion has shoots 5 to 8 cm long. This will usually be two to three weeks after bud burst.

Plants grafted in outdoor situations are usually staked with a small stake tied to both stock and scion to provide protection from wind.

Many interesting plants can be produced by grafting and the current work being carried out in the production of weeping grevilleas illustrates this.

TRANSFERRING TISSUE-CULTURED PLANTS — IN PARTICULAR GREVILLEAS — TO THE NURSERY ENVIRONMENT

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When plants propagated by tissue culture are transplanted from the sterile high humidity conditions of the tube or jar to the nursery environment, the results are often very disappointing. When evaluating these results we should not look at transplanting as a single process, but rather as a chain of events with conditioning of plants for transplanting; the actual transplanting; the media; temperature/humidity; and hygiene, all being links in this chain. If we then learn to understand each link and understand how it fits into the chain, results will improve.

It should be pointed out that tissue-cultured plants differ physically from similar sized plants grown conventionally, e.g. under mist from cuttings. When first removed from sterile culture their leaves are thinner, they have less cuticle and are less waxy. They are less functional, as their stomates do not respond as efficiently to stressful conditions. Often instead of closing rapidly they remain open. These factors cause the