



Above—Hedge of *Albizzia lopantha* 10 months from sowing. Right—Tall shelter provided by Lombardy poplar with barberry for low shelter.



5ft. Thus 5 chains of shelter 20ft. high should give fair protection to approximately  $1\frac{1}{2}$  acres of orchard on the flat. If the land slopes away from the hedge on the sheltered side, the protected area is likely to be greater, and the reverse applies if the shelter is on the lower side of the sloping land.

If there is tall shelter near the orchard area, it is possible that only secondary shelter of medium height will be required. The density of shelter, as well as the height, must be taken into consideration. A compact shelter all round an orchard tends to create a pocket where there is hardly any air circulation. In summer this lack of air movement is likely to cause scalding of fruit, foliage, and young shoots, and in winter there would be a likelihood of frost settling within the area. A more open hedge on one side would allow for improved air circulation; this should be on the leeward side of the prevailing wind and where possible on the lower side of the block to allow for air drainage.

#### Distance between Shelter Belts

Because land contours vary, it is not possible to stipulate exactly how far apart shelter belts should be planted. With rolling or undulating land where there are areas suitable for citrus growing some natural shelter is provided and requirements will differ from those on tracts of flat or gently sloping land, which are more exposed to winds. Undulating country tends to break up wind, and the use of high-growing shelter belts usually is not as essential as on flatter, more exposed areas.

Under most circumstances it is necessary to plant high shelter surrounding about every 10 acres of citrus orchard to provide reasonable protection from winds. The southern and western boundaries usually need greatest protection, and in some districts, according to local conditions, it may be possible to modify shelter requirements on eastern and northern boundaries. On the more exposed boundaries the planting of high shelter trees in conjunction with lower-growing but denser trees is desirable to reduce possible ill effects to growth caused by ground draughts.

An area of 10 acres requires subdivisive as well as boundary shelter.

Normally such an area is best subdivided into blocks of about 2 acres and shelter planted to divide each block. Shelter trees selected for that purpose should be of the lower-growing types and after planting should be kept well trimmed.

Frequently too little attention is given to the selection of the type of shelter to be planted around a citrus orchard. The area to be sheltered should be studied and the kinds and type of shelter required decided upon, care being taken that they are suitable for the district. Horticultural officers can advise on suitable types for a locality and give details of methods of propagation of hedge and shelter trees.

#### Suitable Shelter Trees

Shelter trees for citrus orchards may be of temporary or permanent types.

##### Temporary Shelter

Temporary shelter consists of rapid-growing, short-lived species which give fairly good protection from winds within 18 months to 2 years from planting. Such temporary shelter, because of its rapid growth, provides effective shelter for newly planted orchards. If kept trimmed, these temporary species will last from 8 to 10 years, but when permanent shelter becomes of sufficient height and density to protect the orchard temporary hedges should be removed.

**Species:** Temporary shelter can be provided by growing *Albizzia lopantha*

(Benth.) (brush wattle) or *Cytisus proliferus* (Linn.) (tree lucerne). *Albizzia lopantha* is preferable. Both can be seeded about October in the permanent positions. They should be trimmed frequently. *Albizzia lopantha* is usually the more vigorous and may reach a height of 12ft. within 2 years; it is somewhat frost tender, particularly in the seedling stage. A fault with tree lucerne is that odd plants

[Rendell's Photo Service photo.]

in the hedge line tend to die, leaving gaps that create a serious draught, which is often more detrimental to citrus and sub-tropical trees than no shelter.

Germination of the seed will be improved by the following treatment: Place the seed in a tin, pour boiling water over it, allow it to stand overnight, and wash it next day in 2 or 3 changes of cold water and spread it out to dry for about an hour before planting.

##### Permanent Shelter

For permanent shelter there are a number of varieties of trees from which a suitable selection may be made. The varieties chosen should be adapted to local conditions, long-lived, and, if possible, not hosts for insect pests or diseases attacking citrus. If circumstances permit, permanent shelter should be established at least 2 years before citrus trees are set out.

**High shelter:** Trees suitable for providing boundary shelter in exposed areas are *Pinus radiata* (Don.), *Eucalyptus macarthurii* (Deane and Maiden), and *Populus nigra* var. *italica* (Du Roi) (Lombardy poplar). *Pinus radiata* and *Eucalyptus macarthurii* do well in the citrus areas and stand periodical cutting back, if they overhang or get too tall. Although both tend to rob the soil for a considerable distance from the shelter line, little trouble should be experienced if citrus trees are at least 30ft. back from the shelter belt.