THE PROPAGATION OF THE MANGO IN JAFFNA—I

W. R. C. PAUL, M.A., M.Sc., D.I.C., F.L.S.,
DIVISIONAL AGRICULTURAL OFFICER, NORTHERN DIVISION
AND
S. C. GUNARATNAM, B.A.,
HEAD MASTER, FARM SCHOOL, JAFFNA

THERE is no fruit tree in the Jaffna Peninsula held in such esteem as the mango. It has been cultivated from ancient times and is now found in almost every home garden. The fruit holds a reputation for excellence of quality throughout Ceylon but the trade in it is not extensive and much of what is grown is consumed locally. During the season, mangoes in plenty but not of the best quality—as growers retain such for their own use—are sold at the local markets and fairs. The export to other parts of the Island is small because the local demand for good quality fruit cannot yet be met.

In spite of the wide popularity of the mango amongst all classes of people in Jaffna, only a few orchards have been established so far. An increasing interest, however, is now being taken in the cultivation of this fruit on a more extensive scale and varieties are being grown which have been selected specially for quality.

There are numerous varieties of mangoes known in the Jaffna Peninsula, most of which, however, are of poor quality. They are commonly called *pulima* or sour mangoes and are mainly used when immature, in curries and other preparations. The inferior varieties have been grown mainly from seed in old and generally neglected gardens ; the better varieties have hitherto been propagated exclusively by the method of grafting by approach or, as it is more commonly called, inarching.

SOIL AND CLIMATE

The best quality fruit in the Jaffna Peninsula is produced on the red limestone soils of the Jaffna town, the Valigamum North and the Valigamum West Divisions. On the sandy soils of the Tenmaradchy and Pachillapalli Divisions the fruit is of poor flavour. The presence of lime in the soil induces good flavour and, especially, sweetness in the fruit.

The mango tree does not flourish on rocky soils nor on such soils where the sub-stratum contains even soft limestone rock as in the Mathagal-Kankasanthurai area. The tree also requires a particularly well-drained soil for the best development of flowers and fruit.

There should be ample protection, especially during the first seven years after planting, against the strong south-west winds which prevail at certain times of the year.

The Jaffna Peninsula, because of its low-rainfall, is more favourable for mango cultivation than other parts of the Island. Areas of higher rainfall are more conducive to vegetative growth with correspondingly poor flowering. Even in the Peninsula, warm cloudy weather at the time of flowering retards the setting of the fruit and, generally, results in an outbreak of mango hoppers which also damage the flowers and young fruits. At the time of flowering, during January to March, unseasonal rains known as mango showers wash the pollen away from the blossoms and thus prevent the setting of the fruit. There is also a second but minor flowering season from August to October but the fruits produced then are comparatively few and of poor flavour.

PROPAGATION

It is now a common practice in the Jaffna Peninsula for the mango to be propagated by inarching owing to the uncertainty of plants raised from seed coming true to type. Inarching, however, has several disadvantages when compared with other methods of vegetative propagation, such as cleft grafting and the various forms of budding. It uses too much material of the mother tree and, until the union is complete, the stock plant must be kept in a pot and attached, at the point of inarching, to a branch of the mother tree. When

propagation is to be carried out an on extensive scale, large numbers of stock plants have to be kept in pots supported on platforms near the mother tree until the stock and scion have united.

In budding, the material required from the mother tree is less than in grafting as only a small piece of a growing twig containing a bud is taken from the mother tree for budding a stock plant.

In this article, a method of budding devised at the Farm School, Jaffna, and found very successful there is described. This method is now being exclusively adopted on the Experiment Stations of the Division. It is possible to raise large numbers of stock plants in nursery beds where budding can be conveniently undertaken. Budded plants have proved to be more vigorous in growth than inarched or cleft grafted plants.

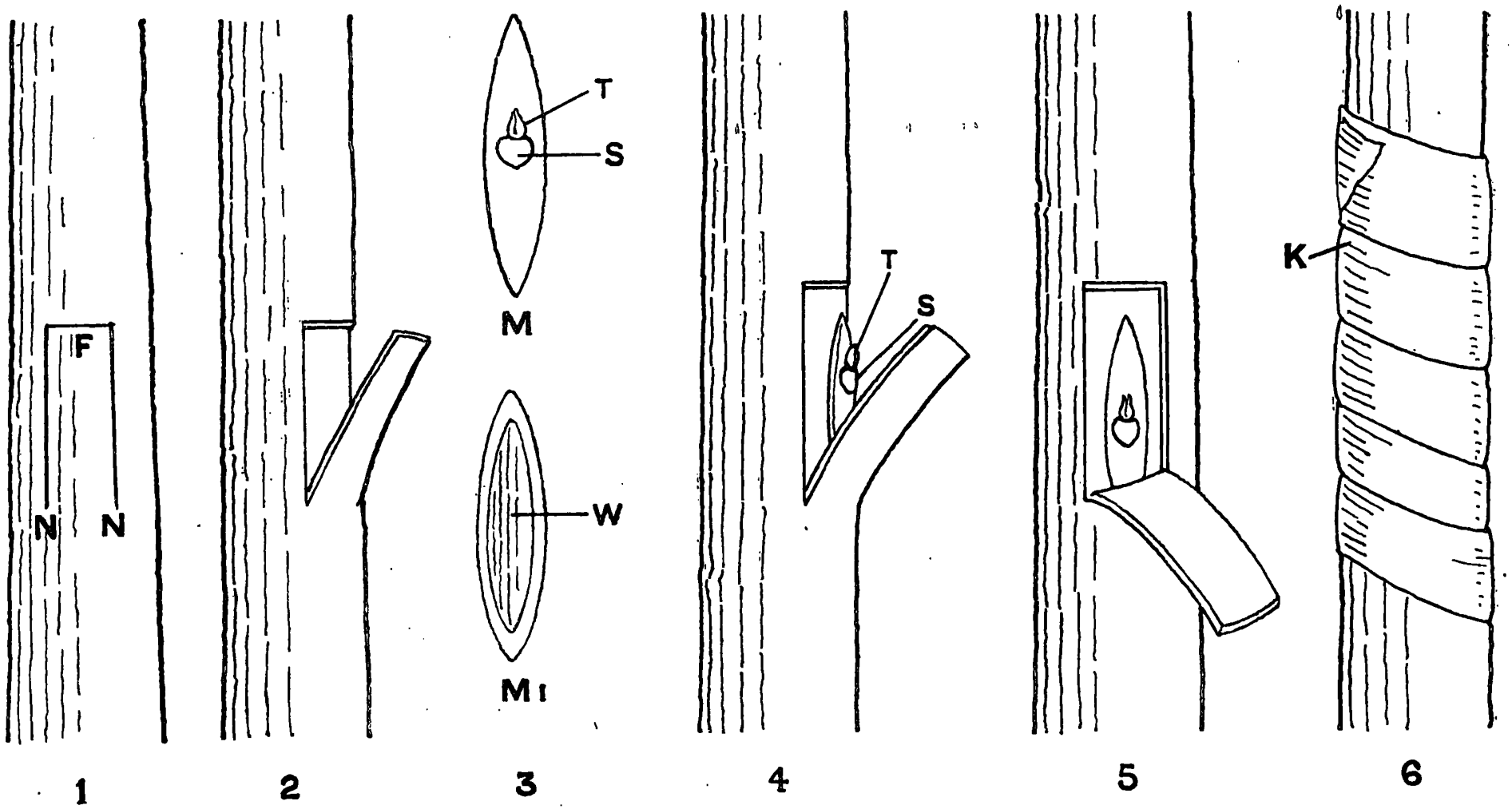
Before budding can be done, it is necessary to grow the stock plants. It is not yet possible to state which variety of stock plant is most suited for each variety of mango to be propagated. Work on this aspect of mango propagation is being pursued at the Farm School, Jaffna, with a number of cultivated and wild varieties of the mango.

Seeds should be germinated without delay after the mature fruit has been picked, as they lose their viability after about a month. Kinman* reported that before germinating the seeds, the hard shell should be removed from the kernel, thereby increasing the percentage germination and reducing the time taken for the germination of the seed. This was confirmed at the Farm School and is now an established practice in laying down nurseries for mango seedlings as stock plants.

It is preferable to plant the seeds in nursery beds at a depth of 3 to 4 inches and at a distance of about 16 to 18 inches apart.

The seedlings should be ready for budding when they attain a diameter of not less than $\frac{1}{2}$ inch at a few inches above ground and this will be when they are six months to one year old. The view is held by horticulturists and others in Jaffna that

*Kinman, C.F.—The Mango in Porto Rico. *Bulletin No.* 24, *Porto Rico Agricultural Experiment Station*, 1918.



BLOCK BY SURVEY DEPT. CEYLON. 5.1.37.

Budding of the Mango

older stock plants are more suitable for inarching in that they give rise to plants which bear earlier, but the writers find that stocks between six months and one year old give more vigorous and earlier bearing plants, when grafted or budded.

The best time for budding is at the end of the monsoon rains but budding can also be done at other times, preferably when the bark can be peeled easily when cut. This occurs during the periodical flushes of growth which last for several weeks. A flush can also be induced to a certain extent at other times by irrigation and manuring. The bark of the stock plant at the point of budding should be brownish or greyish in colour, this condition being reached when the plants are not less than about six months old.

In Jaffna, it is the practice to graft a mango plant high, even at a height of 3 to 4 feet, in order to prevent cattle and goats from eating the leaves of the plant, and under the impression that such plants will bear earlier. Plants which are grafted or budded high are found to be less vigorous than those budded lower, while they are also liable to break at the point of union of stock and scion when they are exposed to strong winds. The most suitable height at which budding should be done is at about 10 to 12 inches from the ground.

In budding, the stem of the stock plant is held firmly in position and a horizontal cut (F) followed by two vertical cuts (NN), about $1\frac{1}{2}$ to 2 inches long, are made in the bark as shown in Fig. 1. The flap which is thus cut is gently pulled down (Fig. 2), leaving a patch of the cambium surface exposed.

The bud or scion should be taken only from twigs of the current season's growth, showing a pale green colour and a smooth surface. The bud is situated just above the leaf-stalk or petiole. Before removal of the bud, the petiole with the leaf attached is severed leaving a small stub, about $\frac{1}{10}$ inch long, attached to the stem. The bud is then cut so that it remains in the centre of a shield about 1 to $1\frac{1}{2}$ ins. in length and of an area which is slightly less than that of the patch left on the stock plant after pulling down the flap of tissue cut in the bark. The cut is so made that a wedge of wood remains underneath the shield. In Fig. 3, the shield with the bud T and the stub of the petiole S is shown at M, while the reverse

view of the shield with the core of wood W is seen at MI. The shield is then placed in the centre of the patch on the stock plant leaving the sides exposed all round as in Figs. 4 and 5. The flap is then pushed up to cover the bud over. Keeping the scion firmly in position waxed tape is then wrapped around it as shown in Fig. 6.

When the weather is hot, a rectangular strip of dry plantain sheath, about 3 × 5 ins. in size, is then tied to the stock plant above and below, thus protecting the bud from desiccation by the excessive heat. During wet weather oil-paper is placed as a cover over the bud to prevent any moisture getting in and thus causing the bud to decay.

After 2 to 3 weeks, the tape may be unwound to examine the bud. If it is still green, it has most probably united. The flap is then cut away and the plantain sheath covering placed over the scion as before to protect it. At the end of another week, the covering is removed and the stock plant ring-barked about 1½ to 2 ins. above the bud.

If there is a flush, the bud should develop in about a week's time and when the shoot has grown to a length of about 3 to 4 ins., the top of the stock should be cut back at the point where it was ring-barked.

When the budded plants are not less than about a foot high, they may be lifted and the tap roots pruned to a suitable length. They should then be potted and, after about a fortnight, they will be ready for transport or planting out in the field.