BURIED-INARCH TECHNIQUE FOR ROOTING CHESTNUT CUTTINGS

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Vegetative propagation of chestnut by rooting is difficult, To date the use of misting systems, plastic tents, bottom heat, and other special conditions combined with auxin treatments have not met with much success in rooting cuttings. The only satisfactory technique of asexual propagation has been grafting, but with this method the possible effect of the stock on scion growth is always present; that is, there is not only a problem of compatibility but also a possible dwarfing effect of the stock on the scion.

As part of the research program at the Connecticut Agricultural Experiment Station it is becoming increasingly important to have a means of vegetative propagation by which the question of stock-scion interaction is avoided.

The technique described below has been successful in producing root tips for cytological studies, and will be used in the future to reproduce vegetatively some of the more promising hybrids so that they can be tested thoroughly under varying conditions. The method described is referred to as the "buried-inarch" technique and involved the rooting of a scion through the aid of a young seedling tree, A similar technique has been used to root other woody plants. such as apple[2], but it had not been tried with chestnuts.

DESCRIPTION OF THE BURIED-INARCH TECHNIQUE

Scions from the last years growth of the desired trees were collected in March and stored in damp sphagnum moss at 4° C until normal spring grafting time. At that time, the end of April and beginning of May in Connecticut, the scions were cut into six- to eight-inch lengths and wedge-shaped on the upper end in preparation for the graft (figure 2, a and b). Meanwhile a small hole about six inches deep was dug at the base of the seedling tree, Above this hole and approximately two inches above ground level a diagonal cut was made in an upward direction in the trunk of the seedling (figure 1). The wedge-shaped end of the scion was fitted into this slit and the lower three to five inches of the scion buried in the ground. The graft union was then bound with suitable material and coated with grafting wax (figure 3), With proper sized stock two or three scions can be grafted into, the same seedling.

Care has to be taken when making the graft to expose at least one bud above ground level, for this bud develops into the shoot. Once the shoot has developed and roots are formed on the base of the scion, the scion can be cut free of the stock, The result is an independent plant,

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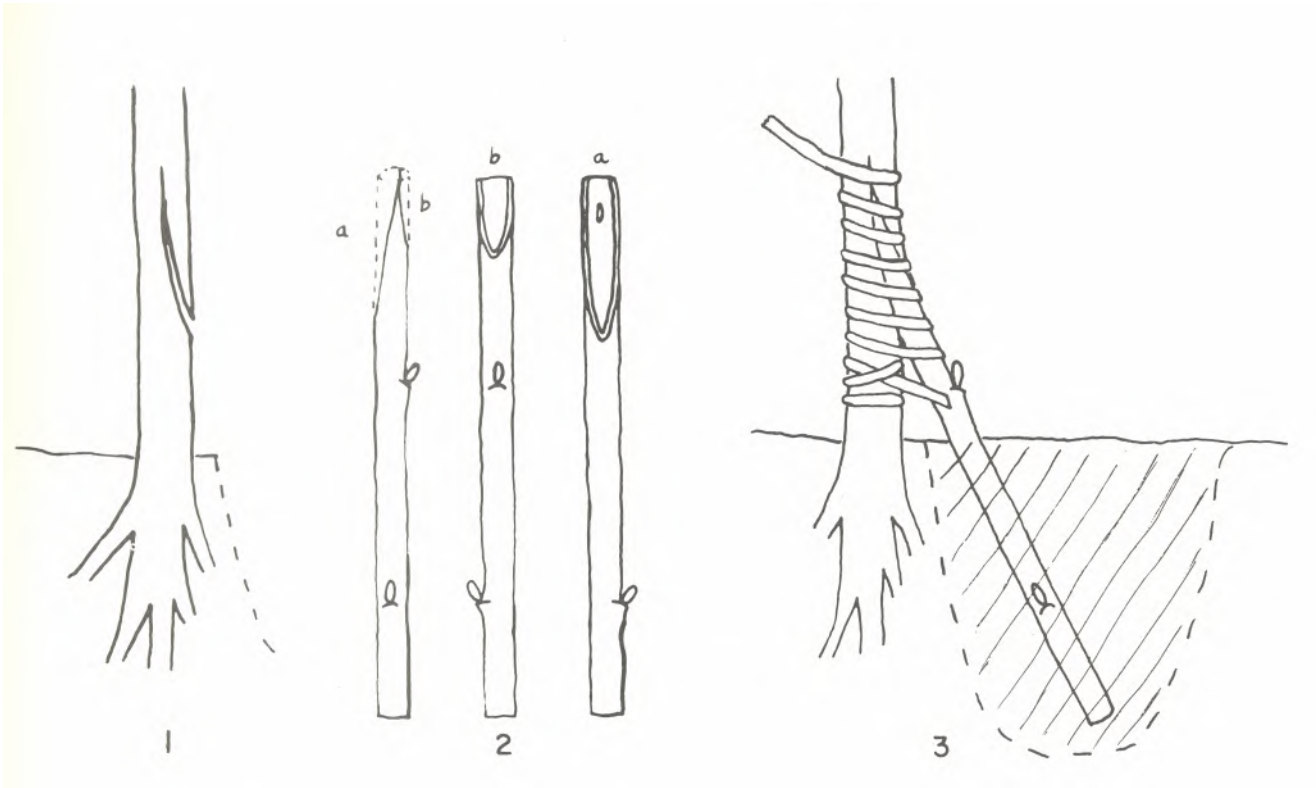
[2] Kemmer, E. 1958. Stadienbeobachtungen an Kernobstgeholzen. Der Zuchter 28: 367-377.



BURIED — INARCH

A grafting technique for obtaining rooted seedlings from scions of hard-to-root species. Root tips were of importance for chromosome counts.

Figs. I and 2 Preparation of the stock and scion.

Fig. 3 Graft completed, wrapped, and ready for waxing.

Fig. 4 Three months after grafting. Note shoot above soil level, roots, and callus.

RESULTS

Callus began to form at the base of the scions shortly after grafting, In some cases this callus became very large and by the end of the summer measured up to two inches in diameter. During the three years this technique was used roots were formed within or above the callused area as early as July, but more often in August and September (figure 4).

The first year the buried-inarch method was tried the grafts were made at a nursery distant to the Experiment Station. There was a drought in May; the grafts were not watered; and, consequently, many died. However, two produced roots, and the majority of the grafts initiated shoot growth from the exposed buds and callused at the base of the scions, The second year 36 buried-inarch grafts were attempted and of these 36% rooted, Root tips for cytological studies were obtained from these rooted scions in September. This spring 105 grafts were completed and on July 20 seventy-six were alive and healthy. A few had rooted, but on the date they were examined the majority had not yet had sufficient time to develop roots.

The results have been very encouraging and it appears reasonable to expect rooting of 50% of the buried-inarch grafts attempted. This figure may be improved upon by using only stocks and scions in good condition, by applying auxins judiciously, and by slight modification in the technique. This past year a wire girdle was placed just below the graft union on some of the stock plants in an effort to increase the rooting of the scions. However, it is too early to evaluate the effect of this treatment.

Results so far indicate that once good rooting is obtained, there is no problem in establishing the scion as an independent plant. However, some care should be taken to protect the stem of the new plant from sunburn by wrapping it with aluminum foil or similar material.

CONCLUSIONS

The buried-inarch technique is presently being used to reproduce promising chestnut hybrids. The method described is little known, but it warrants consideration in the rooting of other hard-to-root woody plants, particularly those where grafting has been demonstrated to be no problem. Cuttings from mature trees, in contrast to those from seedlings, are often difficult to root by conventional methods, but indications are that with the buried-march method there is little difference in the rapidity by which juvenile and mature wood roots.

If a true rooting hormone occurs in plants, e, g. rhizocaline, and is produced in the leaves and transported down the stem, then the method described here would take full advantage of this material by collecting it at the base of the marched scion. Perhaps this is the reason why chestnut and apple scions root when the buried-inarch technique is used.

SUMMARY

A method which is little known in the United States is described by which chestnut material can be rooted. It is basically a grafting technique, and involves the rooting of a scion through the aid of a young seedling tree. The procedure has been important in obtaining root tips for cytological studies. This technique is being used to reproduce asexually some of the best chestnut hybrids, and it is suggested that the method be considered for use in rooting other hard-to-root woody plants.