

Propagating oak by Grafting: G C. Douglas July 2025

Report on visit to specialist grafting nursery in The Netherlands March 7th 2025 on grafting oak scions for producing plants to populate oak seed orchards:

FGRT has contracted a Dutch nursery to graft plus trees of oak which are designated for seed orchards. Gerry Douglas visited the Nursery Boomwekerij M. Brugel in Oudenbosch' March 7th 2025. The objective was to meet with owner Richard van der Horst, and to see the grafting method used as well as the procedures used for growing on the grafted plants as well as discussing the specifications of the grafted plants required. I was also joined by people from Future trees Trust (FTT), and AFBI, N. Ireland who have similar objectives in establishing oak seed orchards.

We were shown the grafting facility, the post grafting frames and the oak plants in the field. The same grafting methodology was applied to all species and with oak, over 90% of the grafts were generally viable. Generally the best grafting period for oaks is December to mid February.

We were shown how to prepare the rootstocks and scions as well as the grafting method and how to cultivate the grafted plants at various stages from the glasshouse to the field.

The stages in the grafting sequence was as follows:

- Grafting secateurs and grafting knives were sharpened to a fine edge. The grafting knives were 'Tina' knives Fig 1 (model 615, 10.5 cm blade; and model 605, 6 cm blade)
- The rootstock plants of various stem diameters can be used, the rootstocks in our demonstration were approximately 6-10mm in diameter i.e. 'pencil thickness'. The scion is typically 7.5-10.0 cm in length.
- Rootstocks used were one year old cell grown seedlings in small pots, and were delivered in the pots from a specialist producer with *Q. petraea* rootstocks used for grafting that species and *Q. robur* used for *Q. robur*. No fertilizer is used in the compost.
- Scions of selected plus trees are generally sent from Ireland to this nursery where grafting takes place. Scions are refrigerated until grafted.
- Fig 1 shows the cuts made to scion and rootstock. The first cut was transverse, made on the rootstock to remove the top part, approximately 5 cm above the root- shoot junction. (Arrow A shows the position of this cut)
- The second cut (B) on the rootstock was made using a downward cut of approximately 34cms in length so that a flap of stem tissue could be prised away from the stem of the rootstock. This cut had exposed cambial tissue on the both the flap of stem tissue and also on the stem itself
- The scion was then prepared by making two cuts on each side of the scion (C) so they were in parallel and exposed the same area of cut surface on each side of the scion. The exposed surfaces of the scion should correspond in size and shape to the exposed surfaces of the rootstock

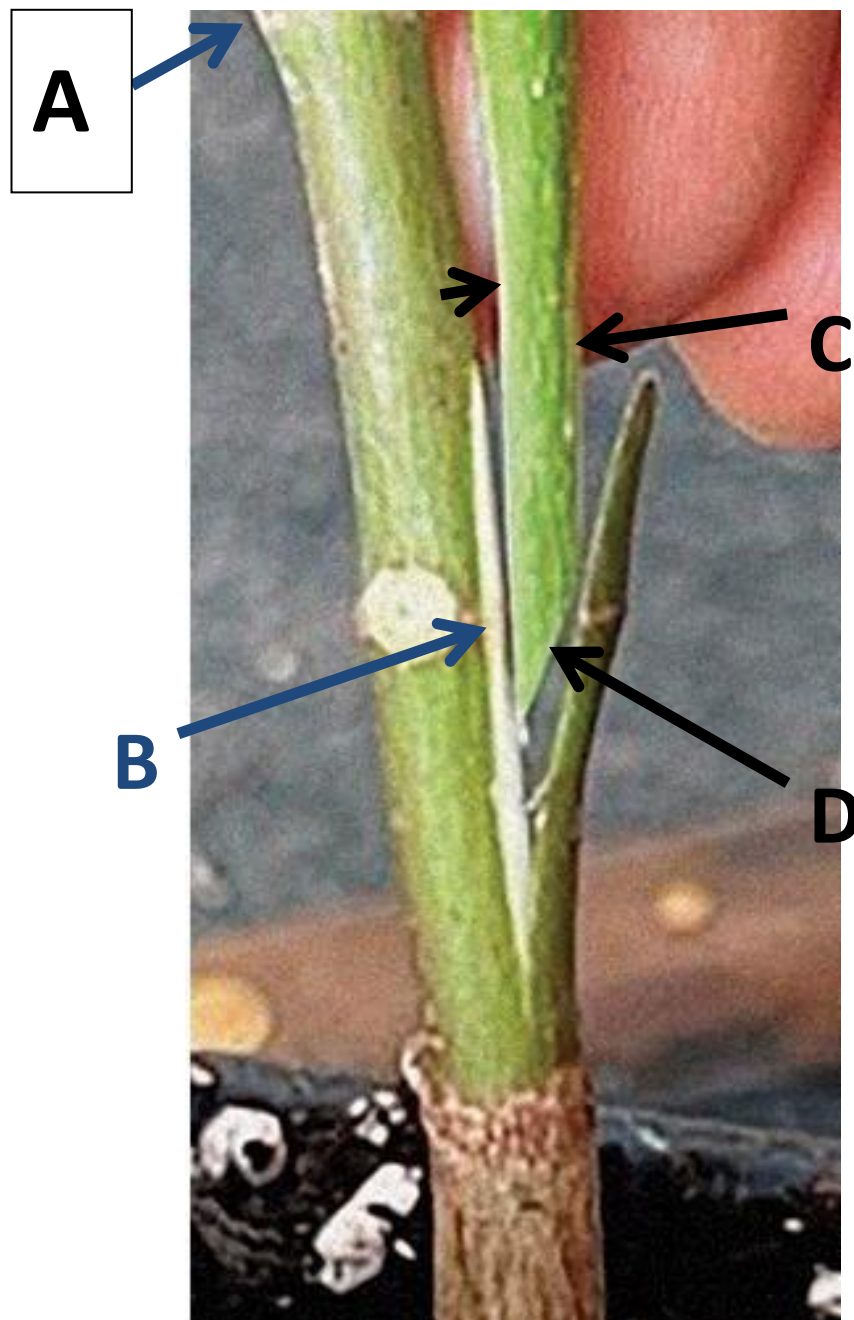
- The final cut was made on the base of the scion (B) at an angle to facilitate positioning of the scion into the cleft of the rootstock so that the flap of rootstock tissue could be folded up onto the scion
- The scion was then inserted into the cleft made in the rootstock and the flap of stem tissue was gently folded back onto the scion so as to align the cambial tissues of rootstock and scion. The flap of scion tissue did not cover the entire length of the cut surface on one side of the stem surface, leaving a small area of stem tissue exposed above the flap called a 'window' because of its resemblance in shape to an arched window. This small exposed area of tissue can be examined to note the development of callus.
- The grafted plant was then held at the graft union area, between finger and thumb and examined by holding it up to the light. Absence of light passing through the graft union indicated smooth cuts in scion and rootstock.
- The graft union was then tied together using grafting tape by stretching and wrapping the grafting tape around the graft junction. It is essential to make a good, tight union. Paraffin wax was not used to cover the graft union. For long scions sometime the top is removed / shortened.

Post grafting treatment of grafted plants:

- Grafted plants were transferred to frames i.e. cloche like structure within the heavily shaded greenhouse (Polycarbonate roof). Temperature was maintained at 18 – 20°C by heated pipes beneath the frames (Fig 3-5). It is very important to get the humidity right so as to keep the union from drying out and to facilitate callus production i.e. warm and humid, but not wet. This was achieved by regular inspections and partial venting of the frames and each day the glass was wiped of excess moisture to prevent drips. Grafts remain in this warm frame for 3 – 4 weeks, until the union starts to callus.
- It is necessary to harden-off the grafted plants at that stage by venting the propagation cases. This is done by opening the glass frames a few centimetres each day. Hardening is done by venting over a period of 7 – 10 days with increasing durations of the venting each day
- When grafted plants were adjudged to have produced enough callus and the buds were flushing they were removed from the frames and transferred to an unheated glasshouse where they remained throughout the first growing season.
- When the grafted plants are moved to the glasshouse and strong flushing starts, the scion is cut back to the strongest bud (Fig 6). This usually means the removal of most of the scion. The apical bud may be the first to flush, but this is often not the strongest bud which is often the one closest to the point of the graft union. This will result in a stronger graft. This results in a small but strong one year old graft. They may also be potted in to larger pots at this time. 100% coir was used and no fertilizer added.
- Generally by mid May and the grafted trees are planted directly in the field where their shoots develop. The new shoots are trained onto a single cane using a 'Tapener' Figs 8-9 .

- Note that the graft union is planted below soil level to hinder the outgrowth of rootstock buds (Fig 9). By the end of the second year grafted oaks attain a general height of 60-80cms

Fig. 1. Sequence of cuts made to rootstock and scion when grafting oaks



Cuts:

- A- Transverse cut on rootstock (just above the arrow)
- B- Downward cut on rootstock
- C- Two parallel cuts on each side of the scion
- D- Angular cut on scion base



Fig 2 'Tina' knives used for grafting, model 605 (top), 615 (bottom) and Fig 2 below overview of the frames used for growing plants post grafting.



Fig. 3 the greenhouse with frames to contain the grafted plants



Figs 4-5 Inspecting grafted oaks from Ireland with some buds beginning to flush



Fig. 6 Lowest strong bud, point at which graft is cut back.



Fig. 7 unheated glasshouse with grafted plants in pots



Figs 8 Grafted plants in field

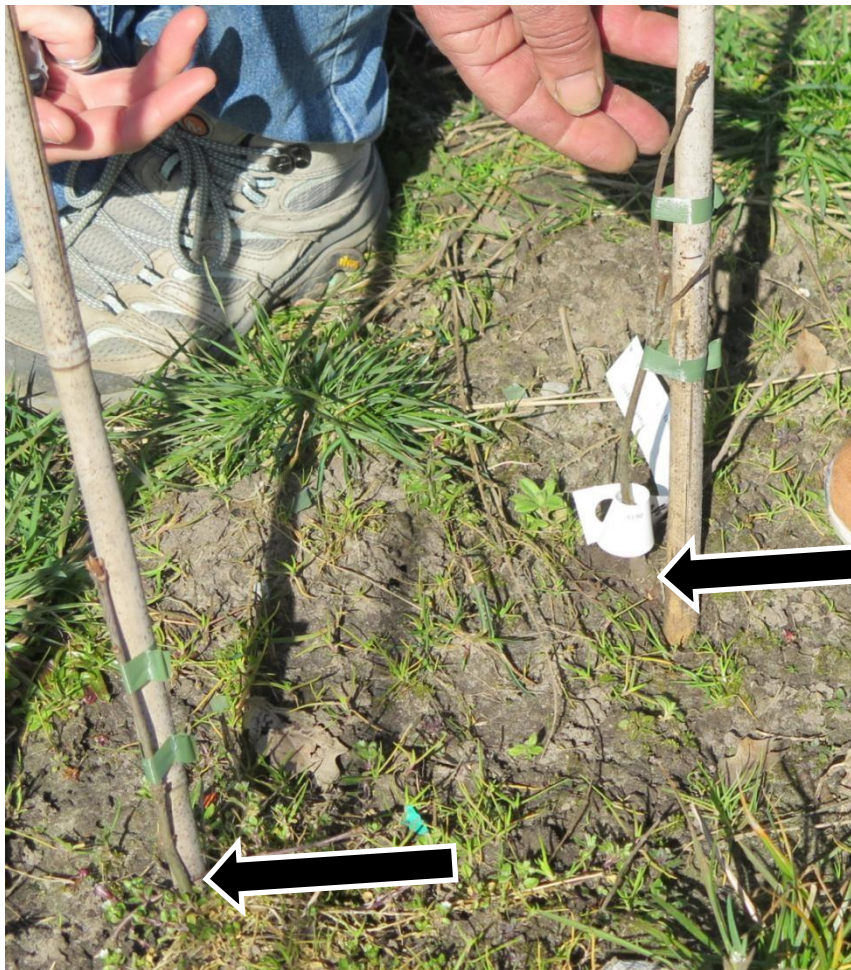


Fig 9 Grafted oaks in the field : Note: plants are staked and graft union is below the soil surface (arrows)