

Propagation of Walnuts



John E. Preece
USDA-ARS

Walnuts are clonally propagated by grafting onto rootstocks



Black walnut rootstock

Paradox rootstock



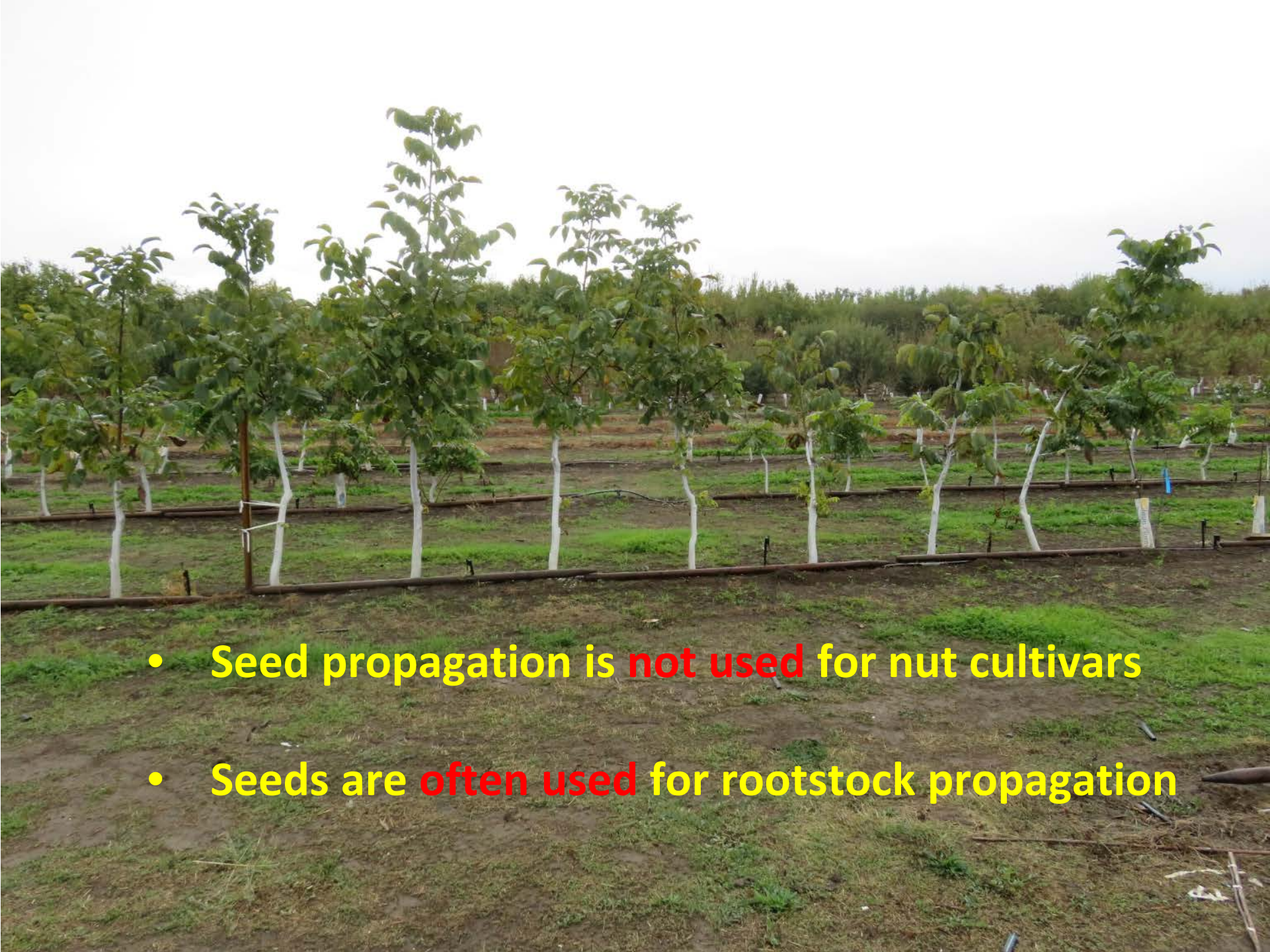
**Vegetative = Asexual =
Clonal propagation = uniformity**



A black plastic seedling tray filled with dark brown soil. Several young plants with green, pinnately compound leaves and thin stems are growing out of the soil. Their roots are visible through the holes in the bottom of the tray.

**Sexual propagation = seed or embryo
propagation**

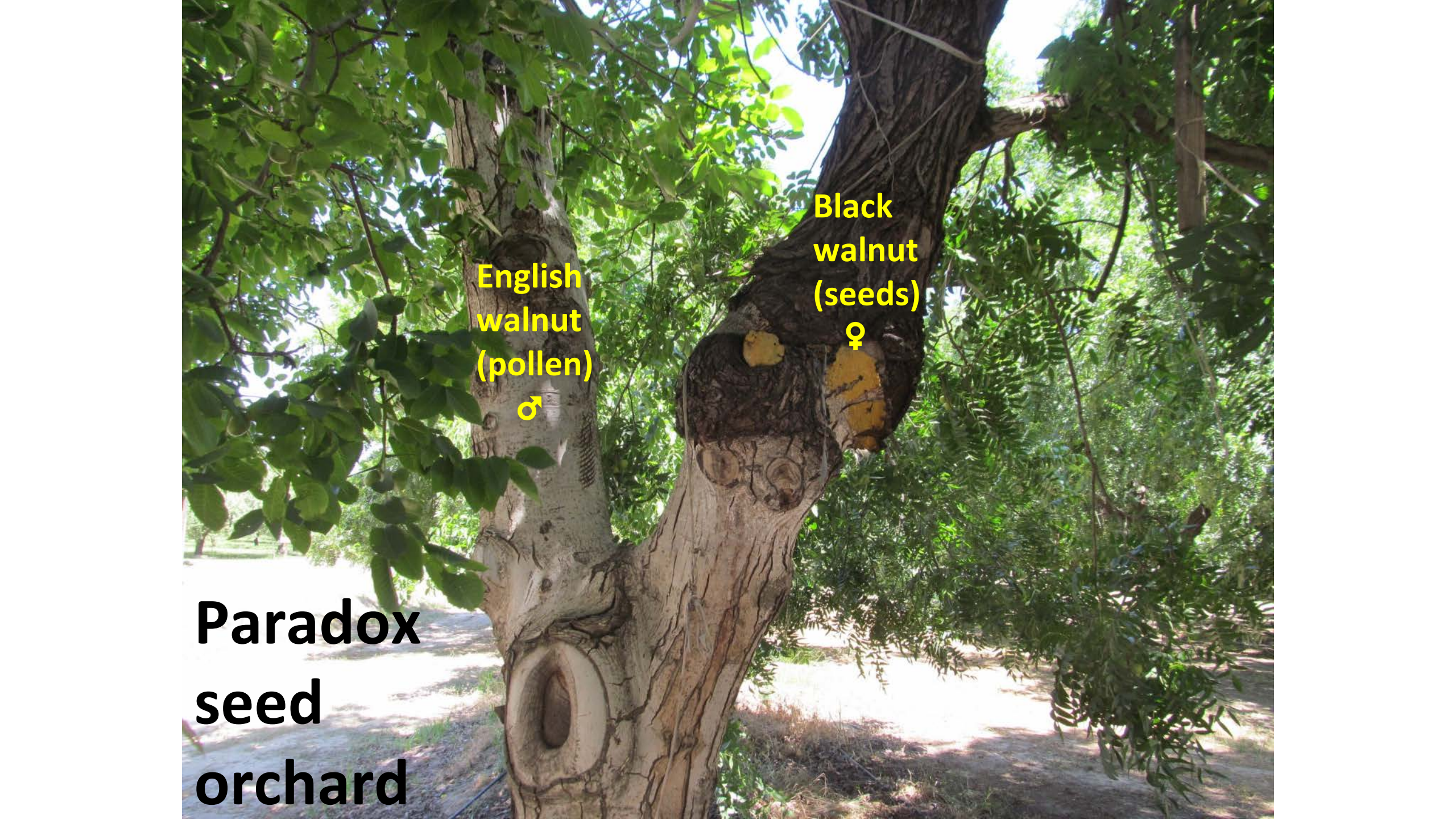




- Seed propagation is **not used** for nut cultivars
- Seeds are **often used** for rootstock propagation



**Black walnut rootstock
seed orchard**



English
walnut
(pollen)
♂

Black
walnut
(seeds)
♀

Paradox
seed
orchard



**For Paradox,
harvest only the
black walnut
seeds**



Paradox

Black

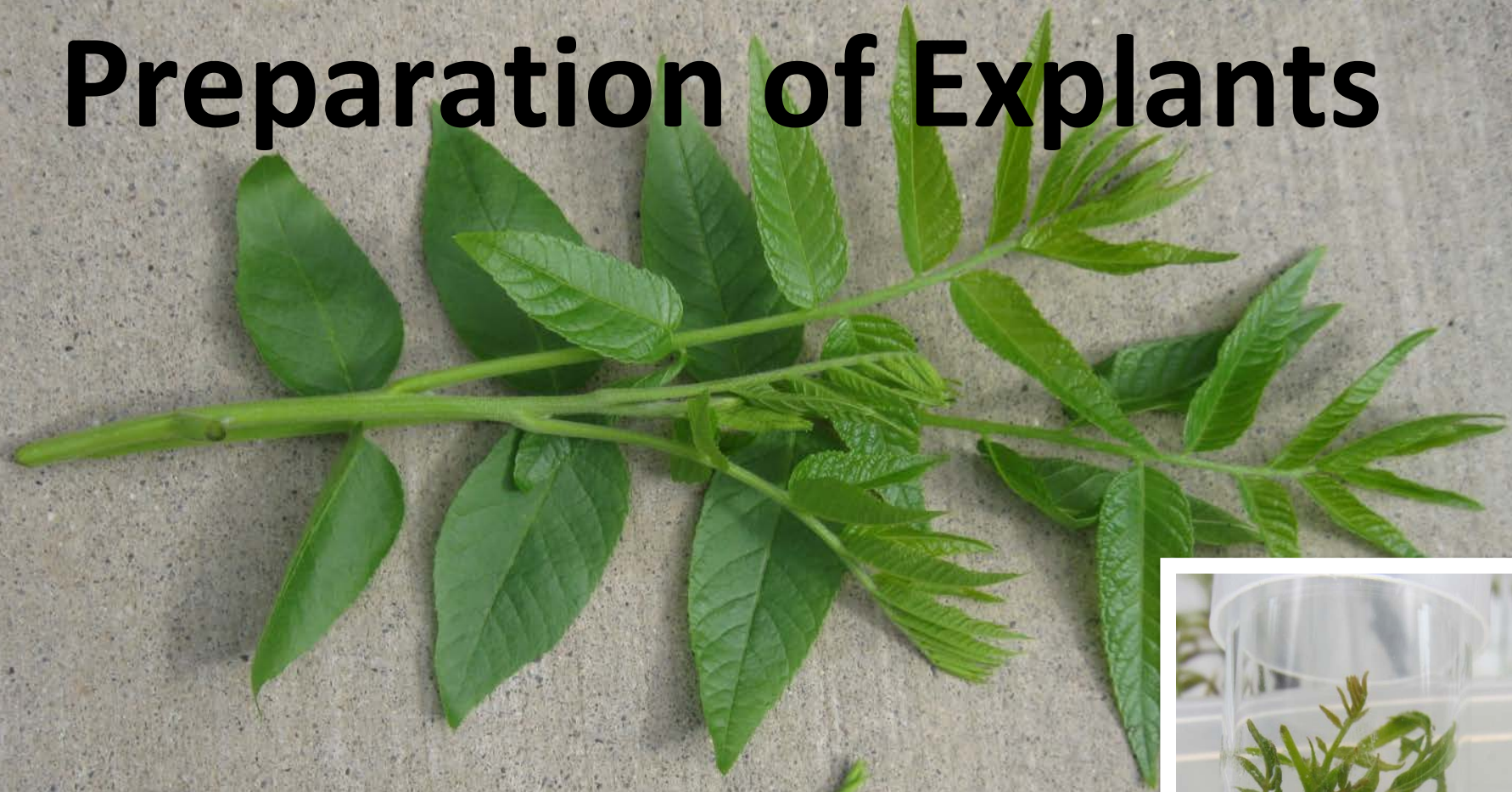


**Rogue
unwanted
seedlings**



**Micropropagation for
clonal rootstocks**

Preparation of Explants



**Stage I
Establishment**



Stage II Shoot multiplication



Stage III Rooting



Stage IV Acclimatization







Clonal
rootstocks
grown to size
in a nursery

Micropropagated clonal Paradox rootstock in nursery row



Clonal Paradox rootstock ready for planting then field budding





**Summer budwood
June or Fall patch budding**

**Double bladed
patch budding
knife
for cross cuts**





**Remove patch by sliding
sideways to retain bud trace**



**Top and
bottom of
patch snug**

**Patch tight
against
wood**



**Wrap the
top and
bottom of
patch to be
airtight**

Parafilm





**Callus is
essential
for
successful
grafts**

**Callus
bridge**



**T-Budding requires a pointed
bud shield**





**Bud
traces**



**An airtight
union
is secured
with a
budding
rubber**



**Left: T-Bud
the Spring
after fall
budding**

**Right: The
top of the
rootstock
was pruned
off**

**White paint
for sun
protection**



The new shoot growing from the grafted bud is initially attached only by callus and new vascular tissue

= a weak break point until well healed and woody





Staking
budded trees
for first year
is necessary



**Budded
trees for
field
planting**

Grafting requires straight cuts

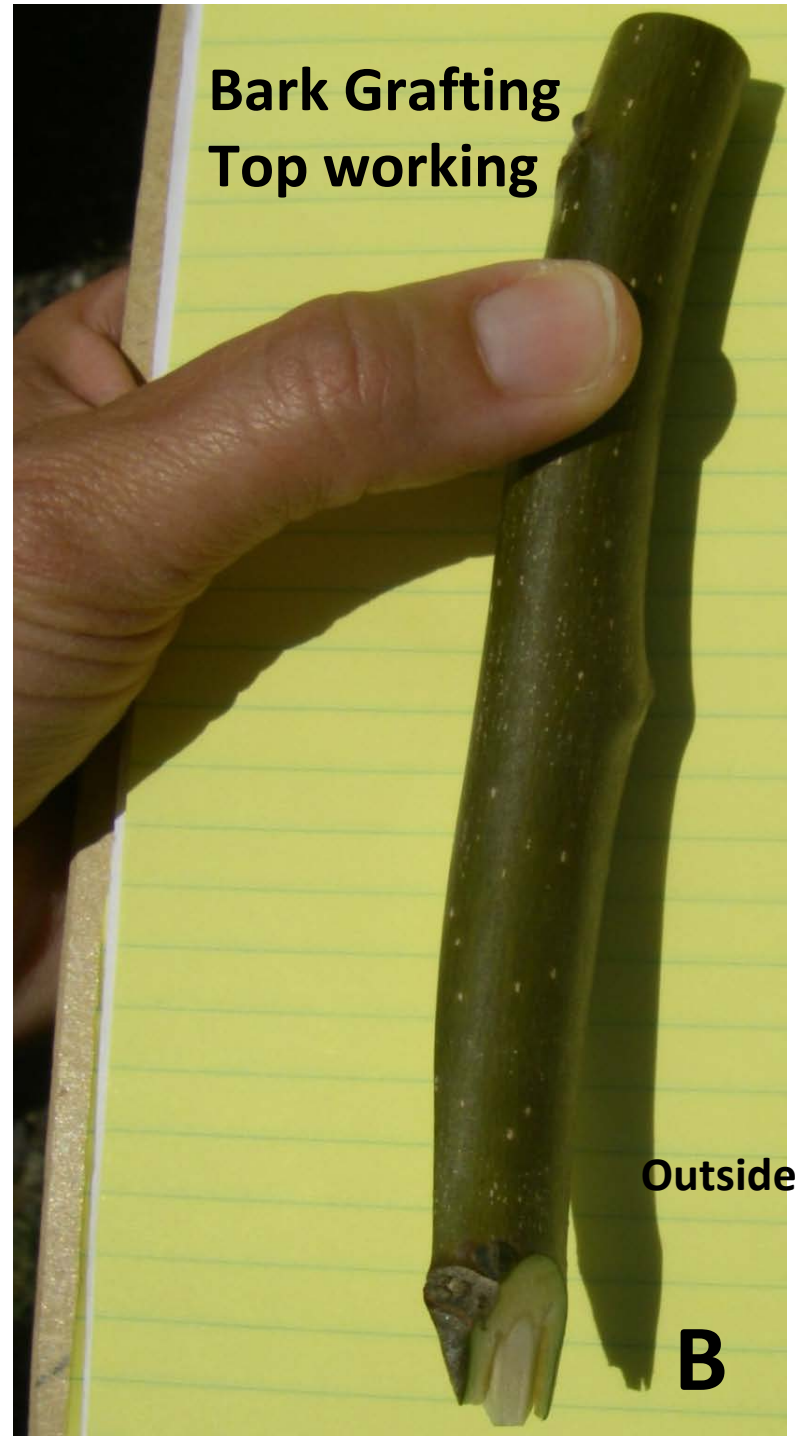


Vascular cambium

- Responsible for stem growth in girth
- Located where the inner bark meets the wood
- Grafts will fail if these tissues are not aligned between the rootstock and scion
- Callus grows from here







**Insert,
then nail
or staple
the scion
through
the bark**



Airtight seal secured with grafting tape and wax



Thank you!

