



Conservation of American Chestnut Genotypes Through Nut Grafting

Parker C.K., Nance W.L., Nelson C.D.

USDA Forest Service, Southern Research Station, Saucier MS



Introduction

- Mississippi lies in the southwestern most part of the native range of American chestnut.
- To date, little attention has been given to American chestnuts native to Mississippi.
- Chestnuts adapted to warmer climates will provide important breeding stock for species restoration efforts, as disease resistance is being incorporated.

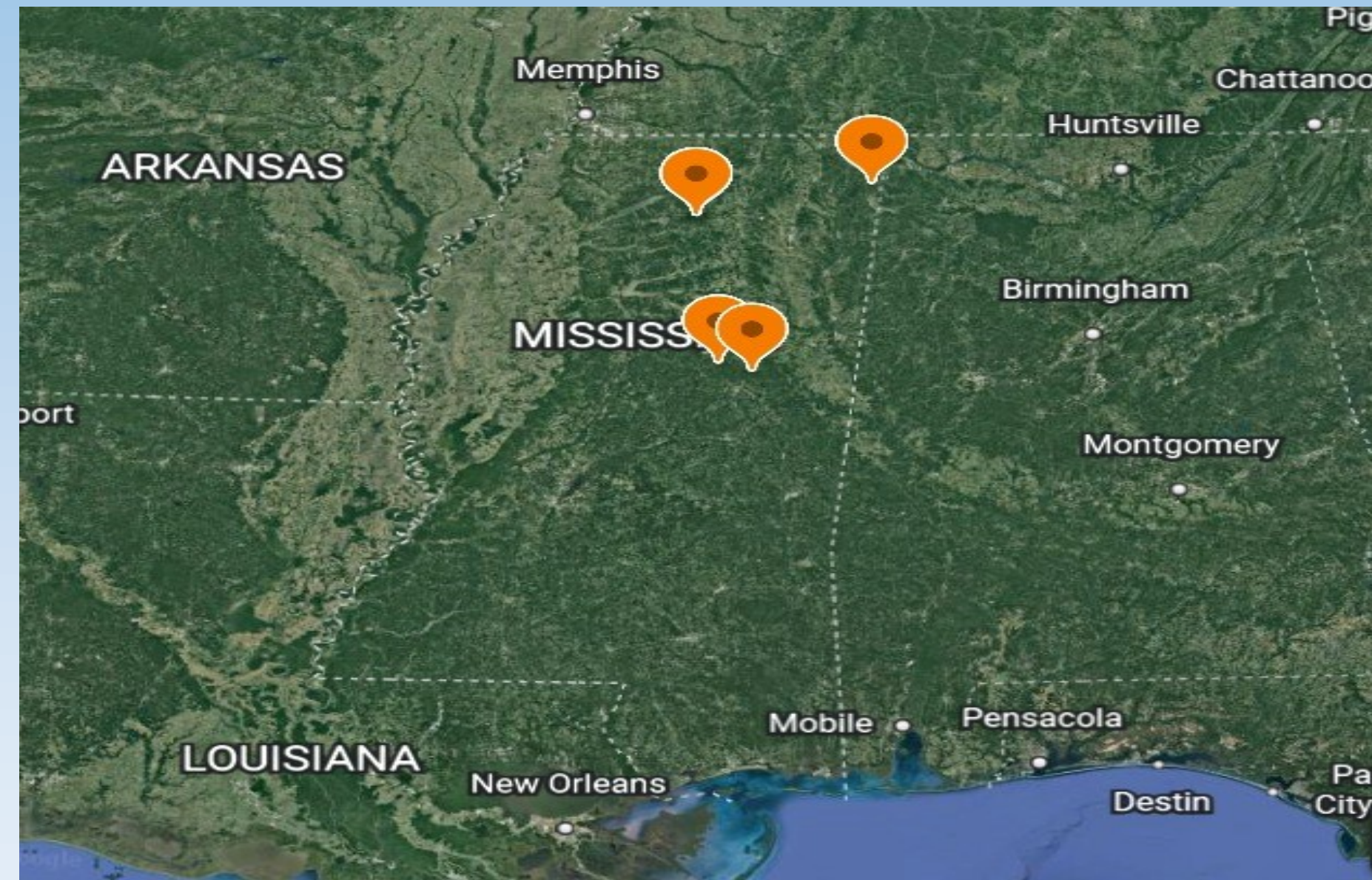


Fig. 1 Scion collection sites

Goals and Objectives

Goal-- Locate, propagate, and conserve as many American chestnut genotypes of MS origin as possible

Objectives

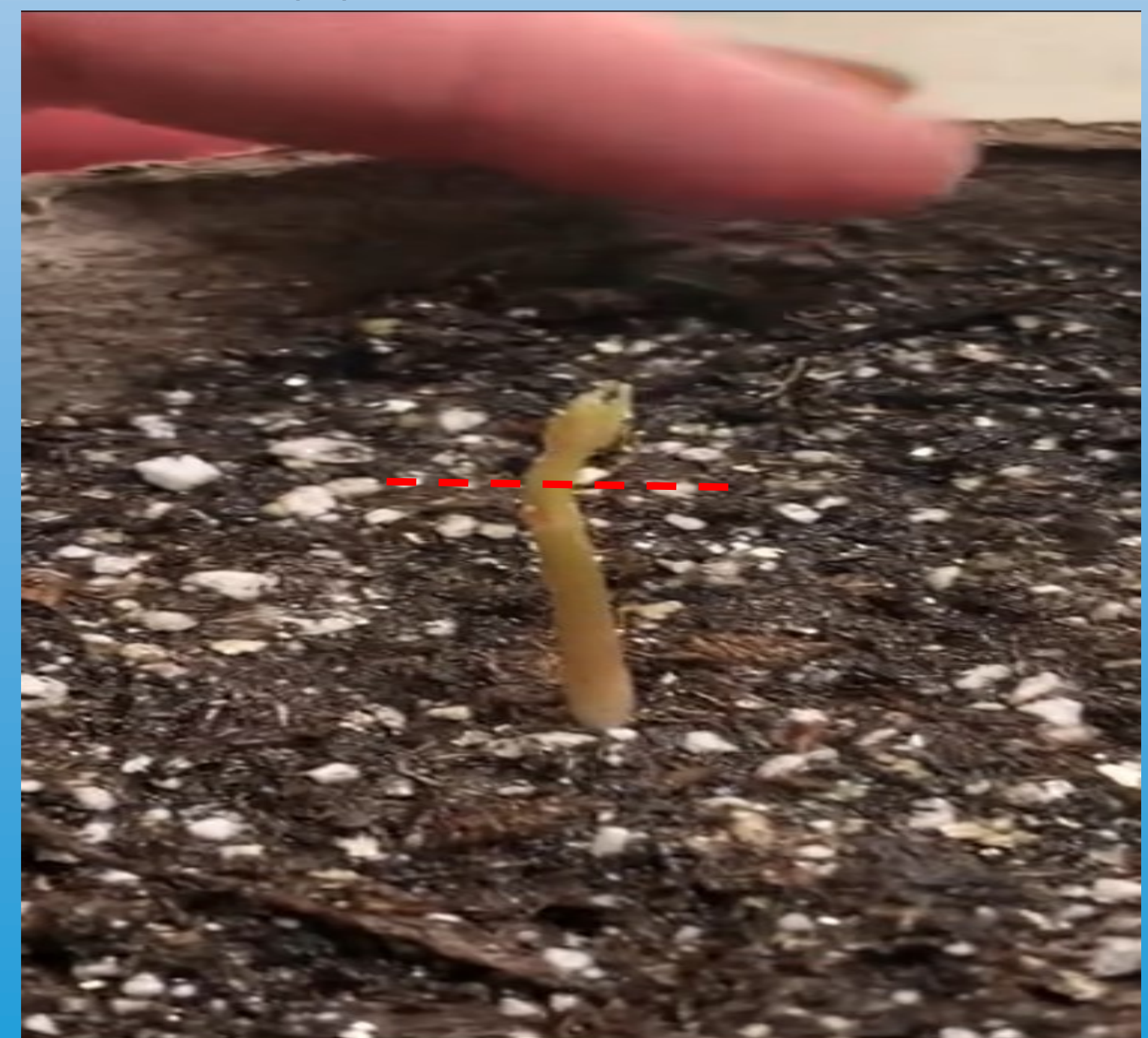
- Develop a reliable vegetative propagation system for American chestnut
- Validate propagation system over time and genotypes
- Propagate all identified American chestnuts and grow to outplanting size
- Distribute grafted propagules to partners for planting in conservation orchards
- Establish 3 conservation orchards on USFS land (Harrison EF, Tombigbee NF, Holly Springs NF)

Propagation Protocol

- Cut scions into 2-4 cm lengths when possible. Two buds can be used if necessary.



- With a razor, shave the bottom half of the scion into a wedge shape.
- Place scions into a petri dish containing distilled water
- Cut the top portion of the root stock off



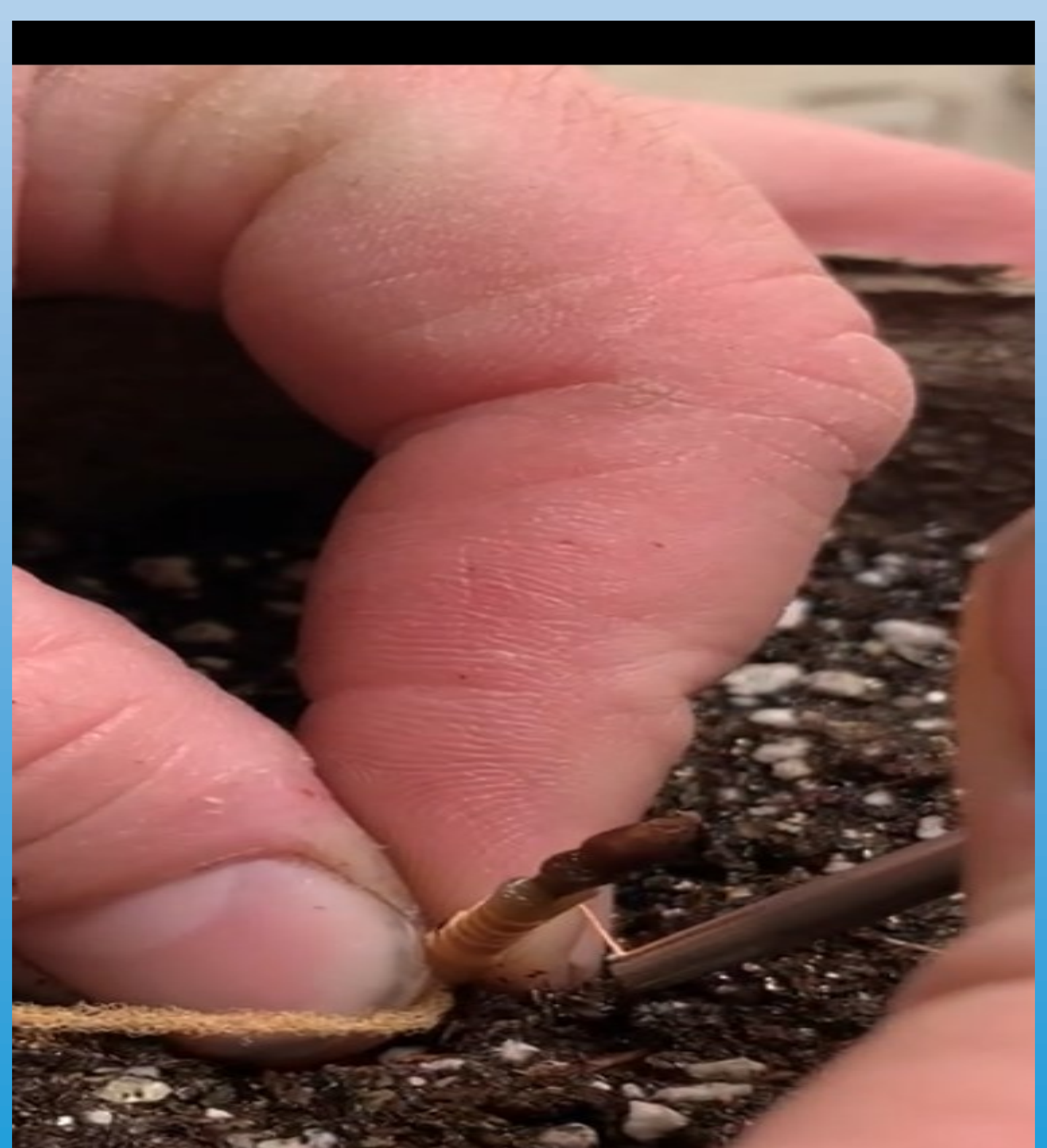
- Split the sprout roughly the same length as the wedge cut on the scion



- Place a wedged scion into the split sprout and align them as best as possible



- Use a fly tying bobbin to carefully wrap the sprout to hold the scion in place. Finish the wrap with a half hitch knot



- Label a gallon-sized ziplock and puncture it a few times under the seal. Holes should be roughly 2mm in diameter.
- Place the pot in the bag and hang in a window with partial sun.



- Check the bags daily. Secondary sprouts from the nut will begin to shoot up and they need to be clipped.
- Over the next 21 days, the successful graft will become apparent.
- When the grafts have leaves of 2-5cm, move them to the grow room and hang them on racks.

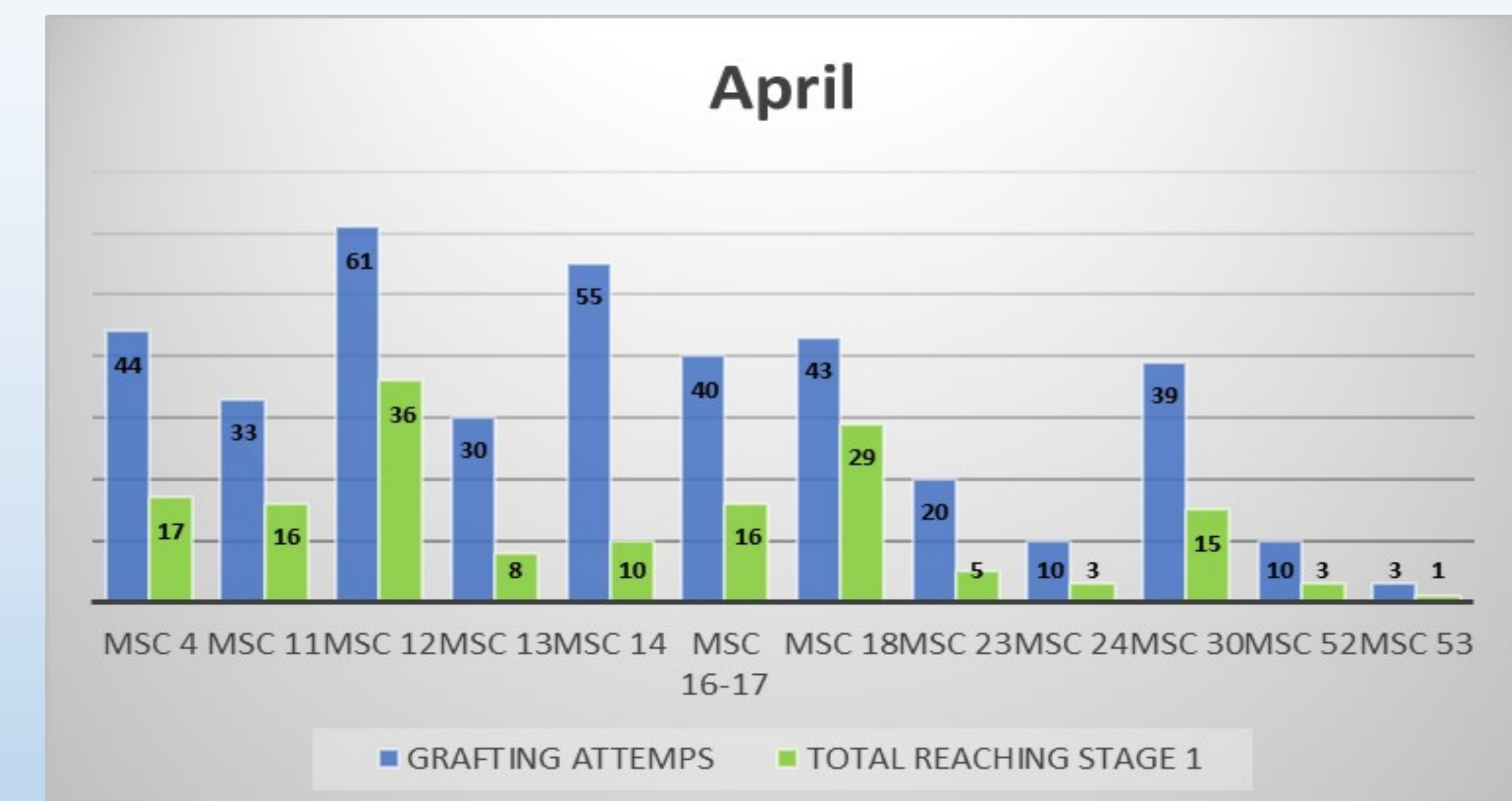
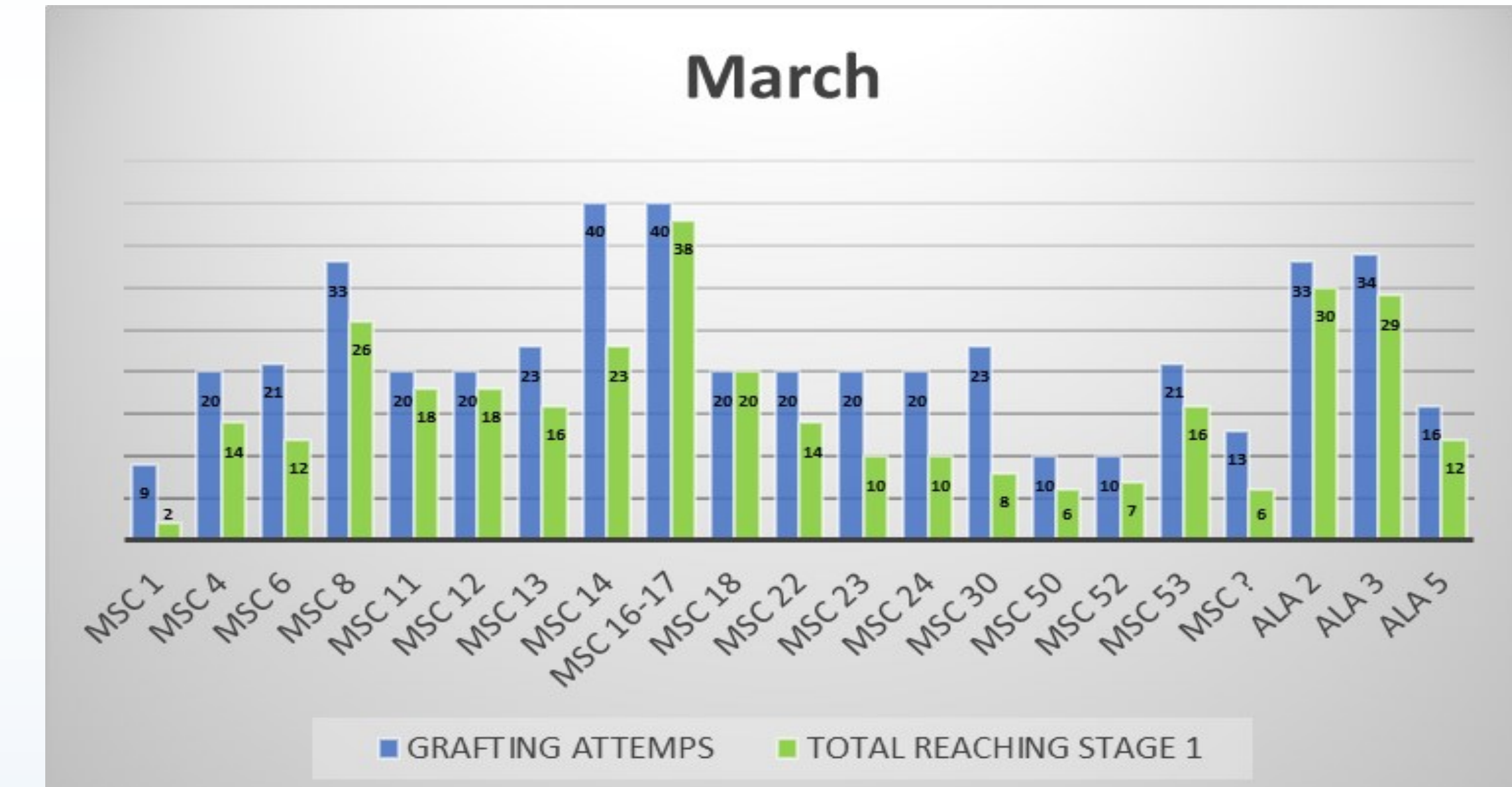
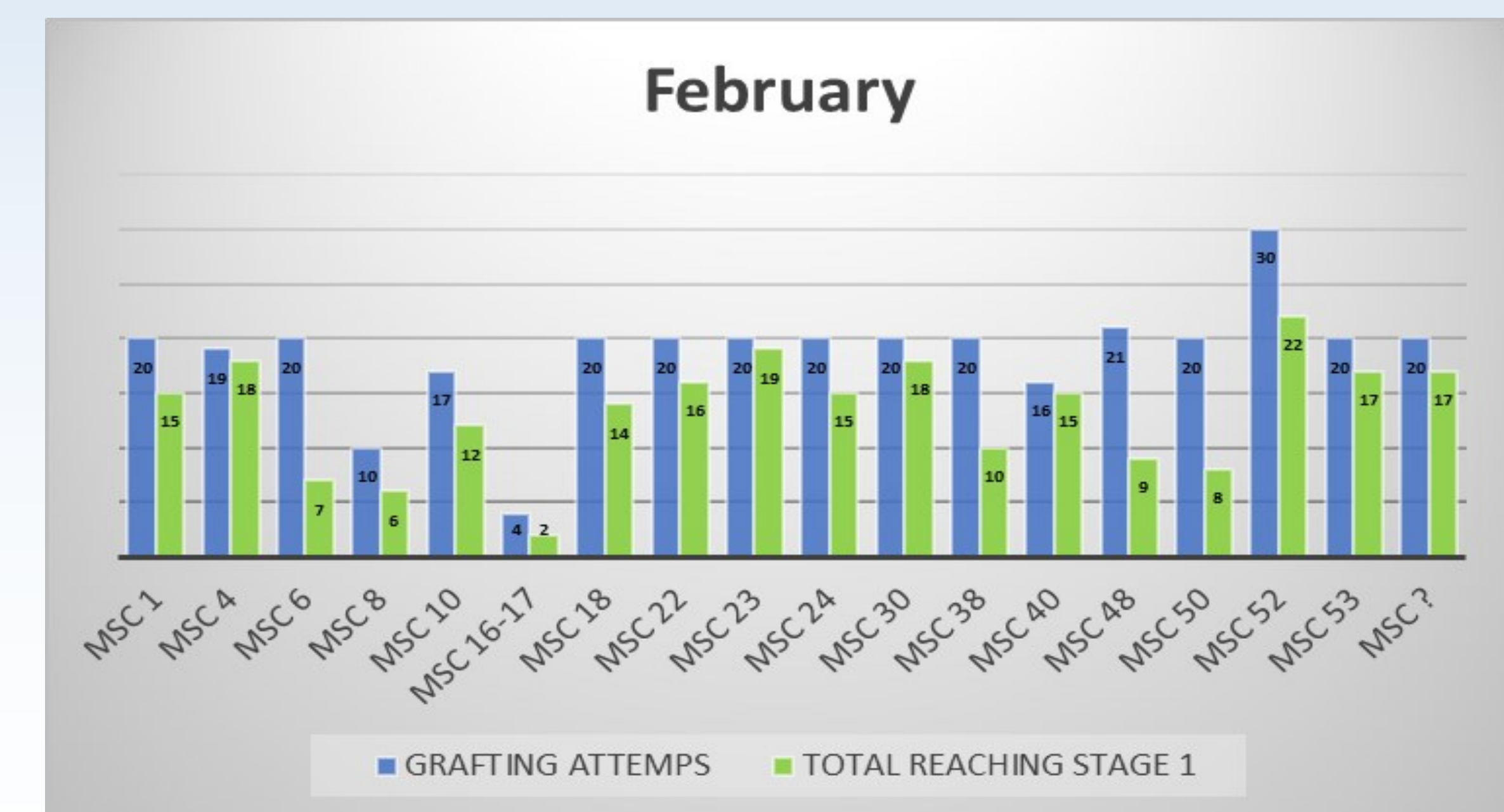
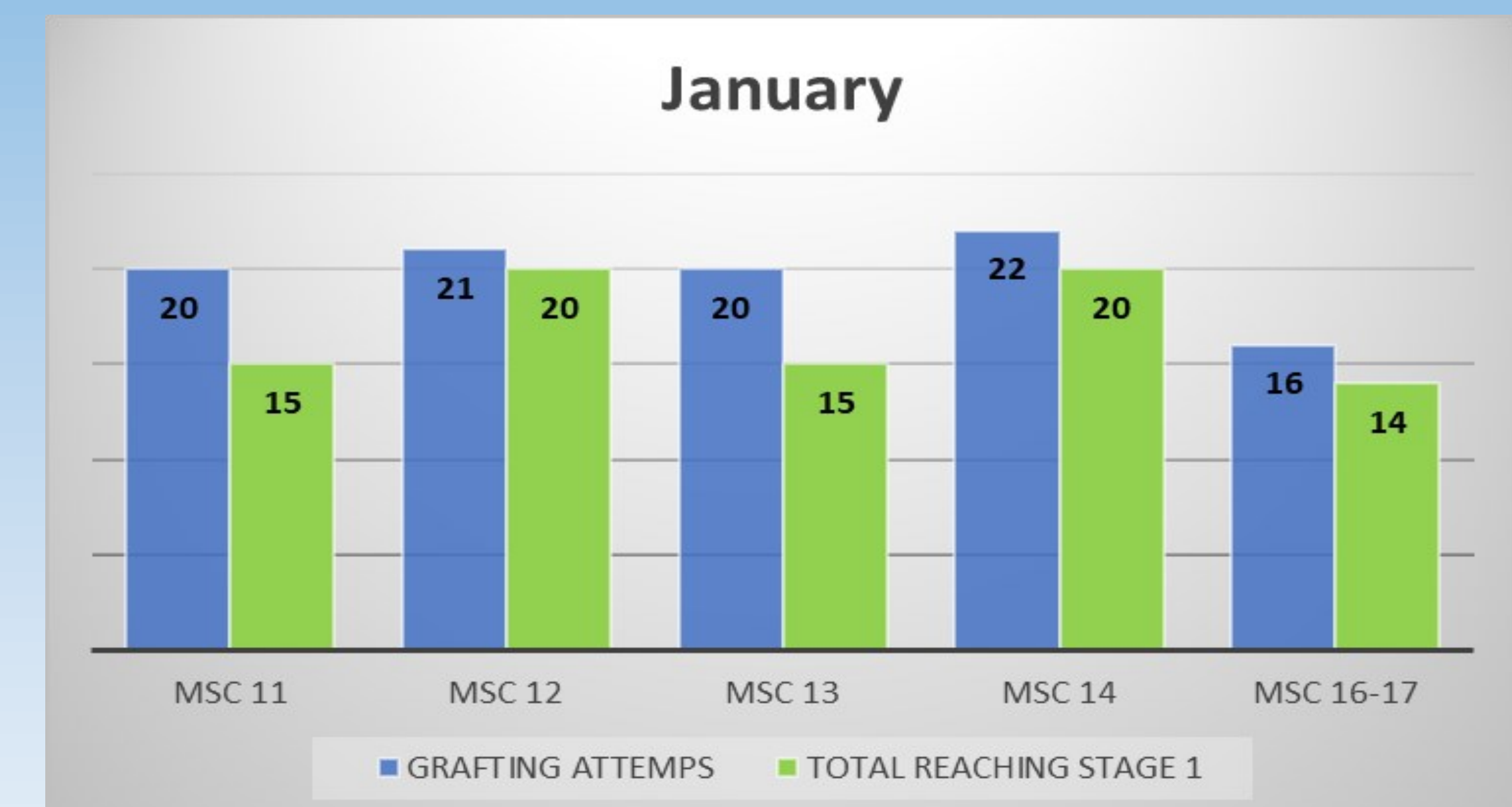


- The bags are opened partially over 2 days until fully opened. Grafts are removed once they have acclimated to grow room humidity.
- In most cases the thread can be cut when they are removed from the bag.



Results

- The results below are based on Stage 1 success percentage.
- Stage 1 is defined as when the grafts are removed from the bags.
- Overall Stage 1 success was around 67%



Discussion

- As of December 2021, we have located 25 American chestnuts in Mississippi. These are being validated with DNA sequencing by TACF.
- The modified nut-grafting technique has proven to be effective and efficient for wild-collected chestnuts
- One grafter can make 20 grafts/hour with up to 90% success rate
- Scions should be collected between Dec 15— Jan 15, stored cold, and grafted onto germinated nuts within 60 days of collection