

REGROWTH OF SEVERED PALM ROOTS

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Abstract. Regrowth response of palm roots severed at various distances from the base of the trunk varied among 4 species of palms. Less than 1% of all cut cabbage palm roots regenerated root tips, whereas coconut palms regenerated root tips about 50% of the time regardless of root stub length. Queen and royal palms regenerated more new root tips as length of the root stub was increased. Root pruning stimulated new root initiation from the trunk for all species, but at a rate inversely proportional to the ability of the species to regenerate root tips on severed roots.

Palms play important roles in landscapes of warmer regions of the world. Palms differ from most broadleaf trees in that large specimens can be transplanted fairly easily. The size of root ball taken with palms transplanted by nurserymen varies from almost nothing to nearly 2 m in diameter. Little is known about the effect of root ball size on subsequent regrowth of roots and success of transplanting in palms. Tomlinson (2) states that if a palm root apex is destroyed, it will usually be replaced by one or more branch roots arising immediately behind the dead apex. On the other hand, it is common practice among people who transplant large palms commercially to cut the roots fairly short (<45 cm) when digging due to a general belief that cut roots will die back to the trunk anyway and will be replaced by new roots originating from the trunk (1). Perhaps this branching response in palm roots is a function of the distance from the trunk that the cut is made and varies among palm species. An experiment was conducted to help answer these questions and to serve as a foundation for recommendations regarding optimum root ball size for transplanted palms.

Materials and Methods

Five 5-8 m tall field-grown palms each of royal palm (*Roystonea regia*), coconut palm (*Cocos nucifera*), queen palm (*Arecastrum romanzoffianum*), and cabbage palm (*Sabal palmetto*) were used in the experiment. A trench 1.5 m long, 30 cm wide, and 60 cm deep was dug on 23 Aug

1982 with a mechanical trencher through the root system of each palm, tangent to the trunk of the palm. This exposed cut roots varying in length from 5 to 100 cm. The trench was then refilled with moist perlite and was covered with a porous polypropylene fabric. Palms were irrigated periodically to keep the perlite zone moist. Eighteen to 30 weeks after trenching, depending on the species, the perlite was removed, the roots re-washed, and root growth response recorded for 4 different length classes (0-15 cm, 15-30 cm, 30-60 cm, and 60-90 cm) of root stubs.

Results and Discussion

The severed queen palm roots were re-exposed after 18 weeks of regrowth. Among 88 roots cut to a length of less than 15 cm, only 3% branched and continued growth (Fig. 1). Percentage of cut roots branching increased to 41% for roots 15-30 cm long and continued increasing with increasing root length to 57% for roots 60-90 cm long. Thus 15-30 cm appears to be the minimum threshold length for branching of cut queen palm roots. Since relatively few new roots initiated from the trunk (mean = 23) during the 18 week regrowth period, emphasis should be on taking as large a root ball as possible to increase the percentage of roots branching and continuing growth.

After 20 weeks the root-pruned royal palms were re-excavated. As with queen palms, the percentage of branched-cut roots increased as root length increased (Fig. 2). Less than 1% of roots cut to 15 cm or less branched whereas 24% of the 30-60 cm-long roots and 36% of the 60-90 cm-long roots branched. Large numbers of new roots (mean = 97) emerged from all royal palm trunks following root pruning. This suggests that if roots must be cut to a length of less than 30 cm where branching is minimal, root pruning should be performed 2-3 months prior to actual moving of the palm. In this way active new roots will already have emerged by the time the palm is

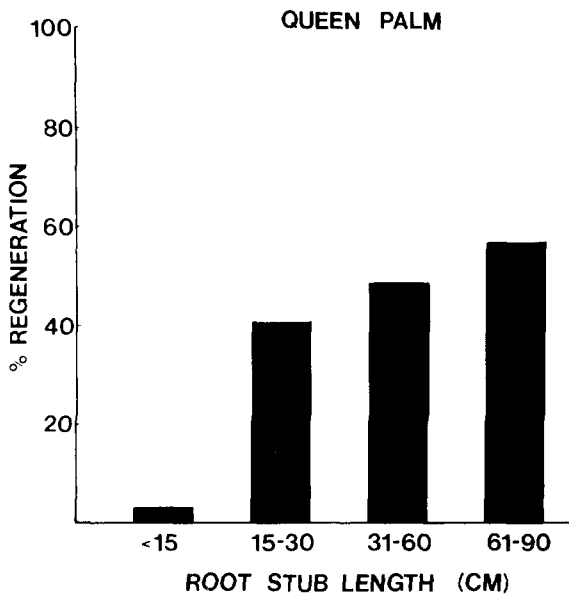


Fig. 1. Average percentage of severed queen palm roots branching in 4 different root length classes after 18 weeks.

moved and transplanting shock should be minimized. If handling large root balls with royal palms can be accomplished, then root pruning prior to digging such that 60-90 cm-long roots remain, should result in considerable branching of old roots as well as extensive production of new roots and would be the preferred method of handling these large palms.

Coconut palms were redug 23 weeks after root pruning. Cut root length had no effect on branching in this species and roots of all lengths branched about 50% of the time (Fig. 3). Relatively few new roots (mean = 20) were produced from the trunk, but that may have been due to the rather young age (ca. 5 yr vs 7-12 yr for the other species) of the coconut palms used in this experiment. Root ball size in coconut palms thus appears to be less important for root branching than in queen or royal palms.

Root regrowth in cabbage palms was much slower and more irregular than in the other 3 species. The severed roots were re-examined 30 weeks after trenching and even then branching of cut roots averaged only 1% for all root lengths (Fig. 4). New root production was extensive

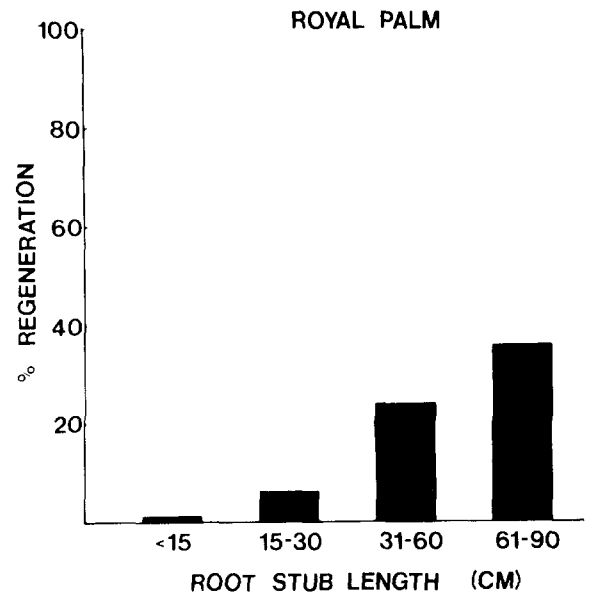


Fig. 2. Average percentage of severed royal palm roots branching in 4 different root length classes after 20 weeks.

(191-393 new roots/palm) on 3 of the 5 palms, but in 2 plants few (5-26) new roots were produced. Since cabbage palm roots generally do not branch at any length, root pruning 8-10 weeks prior to digging for stimulation of new root production is important for successful transplanting of this species.

In summary, cut root branching response varies among species of palms. Percentage of branched roots increases with increasing root length in queen and royal palms so that larger root balls are desirable for branching and continued growth of old roots. Root length had no observable effect on branching in coconut and cabbage palms with half of all cut roots branching in coconuts and virtually none branching in cabbage palms. New roots were initiated from the trunks of all four palms at a rate inversely proportional to the ability of that species to regenerate severed root tips. Root pruning 2-3 months prior to moving the palms is important for species such as royal and cabbage palms in which root branching may be minimal and new root production extensive, but is also helpful for coconut and queen palms which produce some new roots following root pruning.

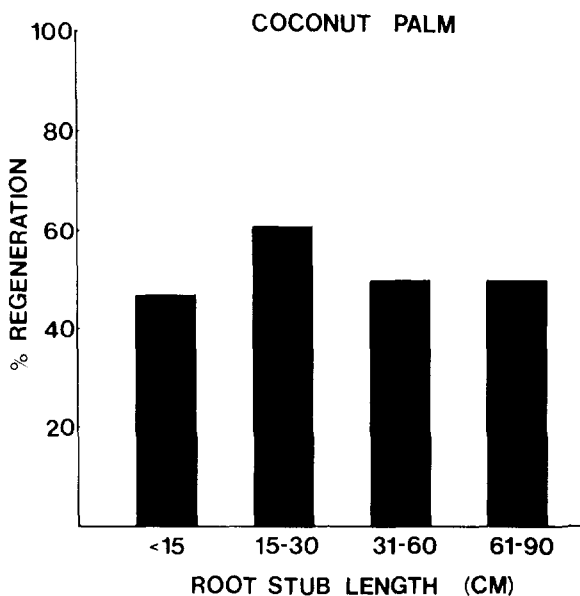


Fig. 3. Average percentage of severed coconut palm roots branching in 4 different root length classes after 23 weeks.

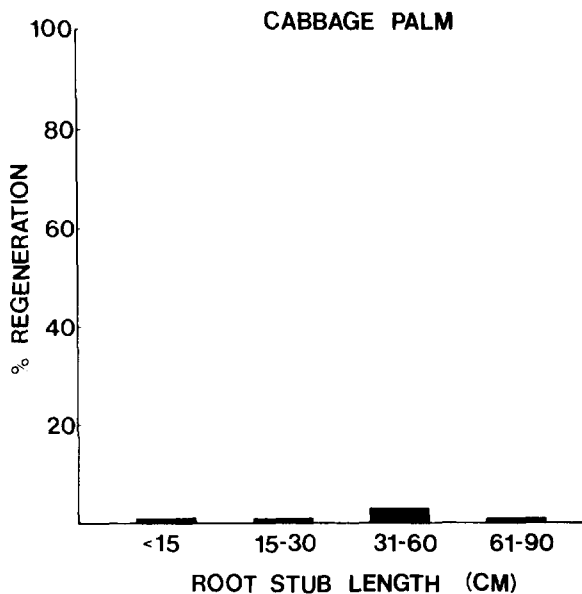


Fig. 4. Average percentage of severed cabbage palm roots branching in 4 different root length classes after 30 weeks.

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2. Tomlinson, P.B. 1961. *Palmae*. p. 47-52. In: C.R. Metcalfe (ed.) *Anatomy of the Monocotyledons*. Vol. II.

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ABSTRACT

KUHNS, L.J. 1983. **Two new herbicides receive approval.** *Am. Nurseryman* 158(4): 75.

Two herbicides have recently received approval from the Environmental Protection Agency for post-emergence grass control in ornamentals. Poast, produced by BASF Wyandotte Corp., Parsippany, NJ, and Fusilade, produced by ICI Americas, Inc., Wilmington, DE, provide excellent control of almost all grasses. They can be applied directly over the tops of a wide range of broad-leaved and needled ornamentals with little risk of injury. In tests conducted at the Pennsylvania State University Horticulture Research Farm, the two materials were applied twice over the tops of container-grown Blue Rug juniper, double file viburnum, Japanese holly, Lalande firethorn, and winged spindle tree at rates of a quarter, a half, and one pound active ingredient per acre. No plants were injured at any of these rates. Because these materials are so expensive, it is especially important that they are used properly.