Final Report
to the California Landscape Contractors Association

Effect of Sand Backfill When Transplanting Palms

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Executive Summary

Neither sand nor soil backfill significantly affected growth of transplanted queen palms or windmill palms. Only king palms backfilled with sand grew significantly more leaves and had a significantly greener canopy and significantly higher survival rate two years after transplanting. Thus, only king palms benefited from sand backfill when transplanted.

Introduction

A standard industry practice in California when transplanting palms is to use sand as the sole backfill medium. The justification for using sand is that it promotes better root growth and establishment and, especially for unusually large specimens, it provides better anchorage and stability than native site soils. However, in most cases using sand as the backfill medium is an additional, significant expense, and large palms are successfully transplanted in many other places without using it as the backfill medium. Unfortunately, there is no research-based information to refute or support using sand as the sole backfill medium when transplanting palms. Thus, we designed and implemented a two-year study to determine if this practice was advantageous.

Materials and Methods

We conducted this study at the University of California South Coast Research and Extension Center (UC SCREC) in Irvine, which is in the south coastal plain of California and has a maritime Mediterranean climate. The soil at the Center is a San Emigdio sandy loam. In May, 2008, we dug and transplanted 10 specimens each of king palm (*Archontophoenix cunninghamiana*), queen palm (*Syagrus romanzoffiana*), and windmill palm (*Trachycarpus fortunei*) from one field to another field about 300 feet distant at the Center. The palms had from 2 to 5 feet of trunk and had been planted about seven years earlier. Palms were trenched on four sides leaving root balls that extended out from the trunk for about 12 inches and were 24 inches deep. Planting holes were 3 ×3 × 3 feet.

Five specimens of each of the three species were backfilled with native site soil and the other five were backfilled with commercially available washed concrete sand. The sand was silica and composed of particles of varying sizes, ranging from 0.002 to 0.008 inch (50%), 0.008 to 0.02 inch (30%), and 0.02 to 0.08 inch (20%). The palms were spaced 15 feet distant in rows 15 feet apart in full sun. The two treatments for each of the three species were replicated five times and the palms and treatments were completely randomized. Palms were planted at grade and leaves were not removed or tied up. The backfill was well watered in with a hose during the planting process. Using climate data and recorded real-time daily evapotranspiration from a California Irrigation Management and Information System (CIMIS) weather station at the site (CIMIS Station 75) (CDWR 2010), we used drip irrigation to irrigate the palms at 80 percent of reference evapotranspiration to maintain the original root ball, backfill, and surrounding site soil evenly moist over the course of the study. No fertilizer was applied over the course of the study. Weeds were removed manually.

Every six months for two years we recorded the total quantity of leaves produced up to that time in the study, estimated the percent area of the canopy that was green (alive), and rated the color intensity of that part that was green (1 to 5, 1 = light yellow, 5 = dark green).

Results and Discussion

Neither sand nor soil backfill significantly affected growth of transplanted queen palms or windmill palms. Only king palms backfilled with sand grew significantly more leaves 6 in sand vs. 1 in soil) and had a significantly greener canopy (2.3 in sand vs. 1.2 in soil), and significantly higher survival rate (100% in sand vs. 40% in soil) after two years. Thus, only king palms benefited from sand backfill when transplanted.

Neither backfill treatment affected percent green canopy of any of the three palms unless backfill settling was considered. After 18 months, of the 15 transplanted palms backfilled with soil 10 had settled at least 2 inches while of the 15 backfilled with sand only one had settled at least 2 inches. Settling was not observed on any other palms regardless of backfill treatment. All species backfilled with soil that settled had lower percent green canopies than those that did not settle.

These data suggest that sand backfill is of somewhat limited value when transplanting palms and largely depends on the species and particular native soil but where it is beneficial it is probably so because of reduced settling. When backfill material settles, soil aeration is reduced, which decreases nutrient uptake, especially iron, and in turn decreases green color of leaves (Broschat 2004). However, sand backfill might be especially beneficial when transplanting large specimens because sand has a high bulk density and packs more uniformly and easily than soil, likely providing better anchorage and support.

Acknowledgments

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Literature Cited

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