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## Comparative Studies of Root Anatomy in Some Date Palm (*Phoenix dactylifera* L.) Cultivars from Diverse Origin

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### Abstract

Worldwide Pakistan is the 5<sup>th</sup> largest producer of date palm (*Phoenix dactylifera* L.) and the species ranks third among the country's fruit crops after citrus and mango. The > 325 date cultivars growing in Pakistan comprise native and exotic ones which differ widely in morphological and anatomical characteristics. Adventitious roots of thirty four cultivars from the collection at Jhang Date Palm Research Station were used to characterise these differences. To this end a 2 cm piece from each root-shoot junction was placed in FAA (formalin acetic alcohol) solution and root parameters were measured by a ocular micrometer under a compound microscope, which was calibrated with the help of a stage micrometer. The collected data on dermal, ground, and vascular tissues subjected to ANOVA and means separated by DMR0.05.

Epidermis thickness was largest in Berehmi (59.9 $\mu$ m) cultivar followed by Dakki (52.8 $\mu$ m) and Kozanabad (46.3 $\mu$ m) while Halawi-2, Jansohaar and Karbalaen had similar minima (21.8 $\mu$ m). The largest Sclerenchyma cell thickness was observed in Shado (209.7 $\mu$ m), followed by Aseel (196.1 $\mu$ m) and Shamran-2 (187.1 $\mu$ m) while values were lowest for Deglut Noor (100.8 $\mu$ m). Makran had the highest cortical thickness (798.7 $\mu$ m) pursued by Zaidi (768  $\mu$ m) and Aseel (738.0  $\mu$ m), whereas thickness was lowest in Jaman (503.8  $\mu$ m).

Saib had the thickest endodermis (49.0  $\mu$ m) followed by Khudrawi-1 (44.5  $\mu$ m), Makran (43.6) and Angoor (44.5  $\mu$ m) while Zaidi and Deglut Noor had similar minima (24.5  $\mu$ m). Vascular region thickness was highest in Chohara (471.96  $\mu$ m) followed by Zardu (460.24  $\mu$ m), Shamran and Khudrawi-2 were similar (452.1  $\mu$ m), whereas Daanda (317.4  $\mu$ m) had the lowest value. The results indicate different evolutionary routes for the date palm cultivars studied which merit further molecular genetic study.

**Keywords:** Date palm, diversity, root anatomy, sclerenchyma thickness