



## **Effect of topograohy and a water repelleny layer on the non-uniform development of planted trees in a sandy arid area**

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A *Tamarix aphylla* forest was planted on arid sand dunes in the northern Negev, where average annual rainfall is 150 mm. Field observations, 40 years after planting, revealed a non-uniform spatial survival and development of planted trees. Trees planted over the crest of the dunes are well developed with large canopies and a high survival rate, whereas trees planted in the interdune flat corridors are small, thin and scattered. A thick litter layer, underlain by a sandy repellent layer, developed below the large trees. The water repellent layer is absent in the area of the small trees. The study focused on the role of the water repellent layer on the water regime over the steep and the low angle dunes. Water repellency was determined by the Water Penetration Time Method. The monitoring of rainfall-runoff relationships was based on runoff plots established in both areas. Samples for soil water content were taken following rain events. Data obtained show a striking difference between the steep and long dunes in all aspects studied. Results obtained show that two opposite feedback mechanisms occurred after tree plantation. The large trees shed a substantial amount of leaves, whose decay developed a water repellent layer. Runoff generation enhanced deep water penetration, through the phenomenon of finger flow. At the same time, due to the lack of a water repellent layer, runoff did not develop in the interdune area; eliminating the positive effect of water concentration. In addition, the soil in the interdune areas is richer in fine grained particle than the active dune crests, limiting thus the depth of water penetration and water availability for planted trees.