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Monitoring Acacia seedlings establishment and survival for a geo-spatial analysis model

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Seedlings are considered the stage most vulnerable to environmental conditions in the life cycle of plants. For plants in general but even more so for desert plants, seedling survival during the first years is crucial to the longevity of the population. Within the study area, Arava valley, southern Israeli Negev desert, flood events have been known to induce germination of seedlings, with only a small percentage (if any) of such seedlings surviving the dry summer.

Following the floods of the 2013 winter (Jan-April 2013), we identified a 50 x 50 m section within the Gidron Wadi (Ephemeral river), in which we located and marked some 50 acacia (Acacia tortilis and Acacia raddiana) seedlings. We monitored the seedlings survival, growth and trunk diameter over the period of three years as well as taking periodical thermal and near infra-red (NIR) photographs. In order to better understand the geohydrology conditions we created a digital elevation model of the Wadi segment that includes the seedlings location, using total station theodolite.

The survey will enable us to locate and map hotspots in the Wadi, which have high potential for seedling establishment and survival. Understanding the conditions (micro-topographic, radiative, plant competition) effect on seedling germination and establishment, can be translated into a spatial rule set of recruitment probability for population dynamic spatial models.