



COLONIZATION OF *Pinus halepensis* IN SOUTHERN MT. CARMEL, ISRAEL SCIENCE, VALUES AND MANAGEMENT

L. Hadar¹, Y. Osem², S. Sagiv¹ & A. Perevolotsky²

¹Ramat Hanadiv Nature Park, P.O.B. 325 Zikhron Ya'akov, Israel.

²Department of Natural Resources, Volcani Center, Agricultural Research Organization, P.O. Box 6, Bet Dagan 50250, Israel.



Introduction - Pine Expansion

The expansion of *Pinus halepensis* from plantations into natural sites is becoming a frequent phenomenon across the Mediterranean zone of Israel. Pine expansion has become a central source of debate among natural conservationists, foresters and other landscape managers. This issue is strongly associated with past ideology and decisions, contradictory opinions and perceptions and a handful of emotions.

Study goals

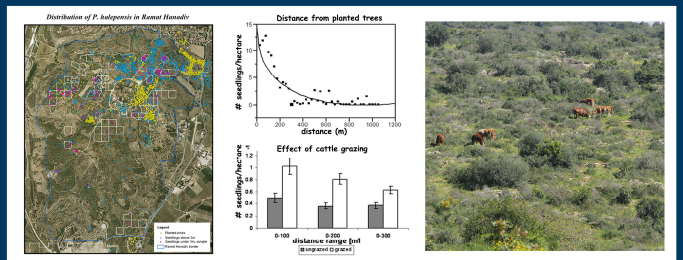
The research goals were to assess and map colonization extent and pine population dynamics, with relation to three factors: afforestation, cattle grazing and fire.

Results

The research indicated that the density of colonizing pines was mainly determined by the proximity to planted pines and that colonization was enhanced by cattle grazing, probably through reduction of the natural vegetation cover. The research results confirmed that pine colonization is significant, dynamic and strongly related to human activity.

A science-based approach

The process began when the continuous colonization of pines in the natural garrigue was recognized by the park managers. The implications of this process were projected to influence the park at various aspects: ecological, functional, visual and aesthetic, land use practice and amenity value. An adaptive management approach was chosen, in which an intensive research was initiated to serve as a basis for objective decision making regarding pine expansion.



Science and Values: different perceptions of the process

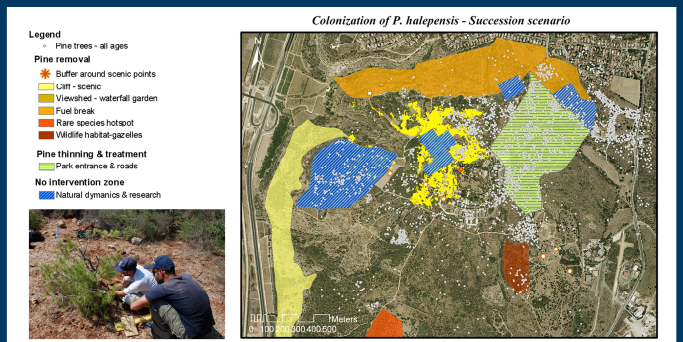
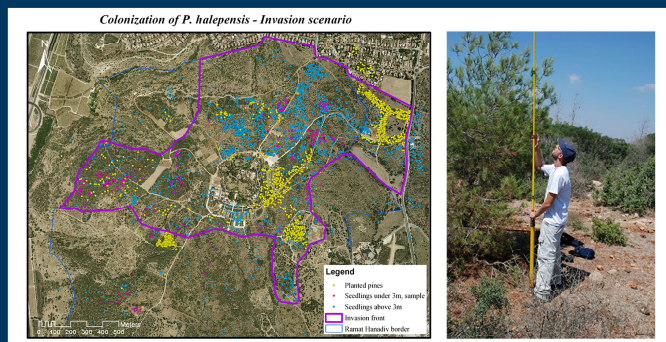
Research findings originated two different perceptions of the process and, accordingly, different management strategies (alternative or complementary).

1) The "invasion scenario"- pine colonization is an undesired human-dependent process that should be controlled. Accordingly, this approach focuses on the spatial dynamics and at the "invasion front", and attempts to manage the factors that stimulate pine colonization: seed sources, cattle grazing and vegetation structure.

2) The "succession scenario" - *P. halepensis* was a native component of the ecosystem before most of its stands were eliminated by humans. This colonization is part of natural succession and self-restoration. Pine removal will only be performed in patches where colonization does not coincide with the park's goals.

Application

The succession scenario was chosen to lead our management decisions. A set of criteria was designed to support management decisions, including view-sheds of scenic observation points, fuel-break zones, spots of special natural and anthropogenic interest, wildlife activity and nesting sites, rare plant populations, long term research plots and hiking trails. All criteria were mapped with GIS, and a management plan is now being under construction, alongside with a long term monitoring program. A "no intervention zone" as well as a "pine free zone" was defined.



Take home message

The process highlights the role of research in adaptive management but also the means by which management choices reflect fundamental perceptions and values. Information is necessary for reasonable decision making. However, prescribing a management strategy still requires an explicit point of view concerning the role of pines in the park.