Ben-Gurion University of the Negev
Jacob Blaustein Institutes for Desert Research
The Swiss Institute for Dryland Environmental and Energy Research
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Seminar

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Tuesday, June 27, 2017, 12:00
Seminar Room, Old Administration Building

This is Anat's Ph.D. summary seminar and refreshments will be served at 11:40.

Consequences of fire season for regeneration and composition of perennial plants in Mediterranean woodlands

Plant species can regenerate after fires solely through vegetative growth (obligate resprouters), only via seed germination (obligate seeders), or using both strategies combined (facultative seeders). Fire season may have important consequences for the post-fire regeneration of plants adopting these strategies, leading to changes in community composition. I hypothesized that owing to lower soil and plant water contents, autumn fires should be more intense than spring fires. I also posited that since spring fires often occur before seed maturation/dispersal, they would inflict a stronger negative effect on obligate seeders compared to autumn fires. In contrast, obligate resprouters would be more restricted in their ability to regenerate after autumn fires, when their belowground carbohydrate storage reaches its lowest level. Facultative seeders can regenerate through both strategies, and are thus less likely to experience a differential fire season effect. To test these hypotheses, I conducted a large-scale prescribed fire experiment in a typical Mediterranean woodland in Mt. Ya'aran, situated on the Judean Mountains, Israel. The experimental system comprised twelve plots, randomly assigned to one of the following fire treatments: (1) spring fire, (2) autumn fire, and (3) an unburned control. As was expected, soil and plant water contents were significantly higher during spring burnings. However, both flame height and total burned area did not differ significantly between spring and autumn burnings, most likely because wind speed was faster during the former. Although fire intensity was largely consistent between the two burning seasons, plant community composition differed significantly between areas subjected to spring and autumn burnings. I interpret this to mean that fire season acted through phenological, rather than fire intensity effects. Differential fire season effects were detected only among obligate seeders, which were more strongly reduced by spring than by autumn fire. The relative growth rate of resprouters tended to be faster after autumn fires; however, this pattern was significant only in *Pistacia lentiscus*. Fire facilitated the germination of obligate and facultative seeders; however, no significant differences in germination density were detected between areas subjected to spring and autumn fires. Growth rate of seeders were similar after spring and autumn fires, expect for *Teucrium diverticatum* (facultative seeder), which grew faster after autumn fires. The survival of *Pinus halapebsis* seedlings, planted after the prescribed fires, was significantly higher in plots subjected to autumn burnings and in the bush microhabitat. This microhabitat was enriched with nutrients owing to higher ash deposition. Furthermore, annual cover was significantly higher in the unburned control plots and in plots subjected to spring burnings, suggesting that pine seedlings experienced a weaker competition with annuals in plots subjected to autumn burnings. All of the above suggest that fire season may influence the circle of "fire event–plant regeneration–fire reoccurrence", modulating the probability and intensity of future fires.