Tallgrass Prairie and Oak Savanna
Fire Science Consortium

JOINT FIRE SCIENCE PROGRAM

Research Brief for Resource Managers

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Mid-summer fire and agricultural pests

Evans, T. R., C.J.M. Musters, E.D. Cashatt, and G.R. de Snoo. 2013. Lepidoptera pest species response to mid-summer fire. Fire Ecology 9(3):25-32.

Management of prairie ecosystems and Conservation Reserve Program (CRP) sites in the upper Midwest occurs within the agricultural landscape. **This study demonstrated the potential for indirect effects of fire on neighboring agricultural fields.**

Management Implications

- New vegetation growth after a summer fire may attract moths and butterflies to lay eggs
- Burning CRP or prairie sites in summer months may increase the occurrence of agricultural pests and should be considered when in close proximity to agricultural fields

In late July of 2012, following a 15 month dry period that was considered as "extreme drought", a wildfire burned a 100 ac (40.5 ha) CRP site in an agricultural landscape of Sangamon County, central Illinois. This CRP site had been seeded with a mix of warm season native grasses and mixed forbs 12 years before the fire. The authors state that the fire was considered to have burned "intensely hot" and it consumed all above ground vegetation.

Following these wildfire events, the authors conducted a study assessing the repopulation of invertebrates and found two serious agricultural pests (order Lepidoptera), the corn earworm (*Helicoverpa zea*) and tobacco budworm (*Heliothis virescens*). Both species are "polyphagous", meaning that they will eat just about anything that is green. The crops that they are known to prey on include corn, tomatoes, cotton, clover, lettuce, peppers, soybeans, and sorghum.

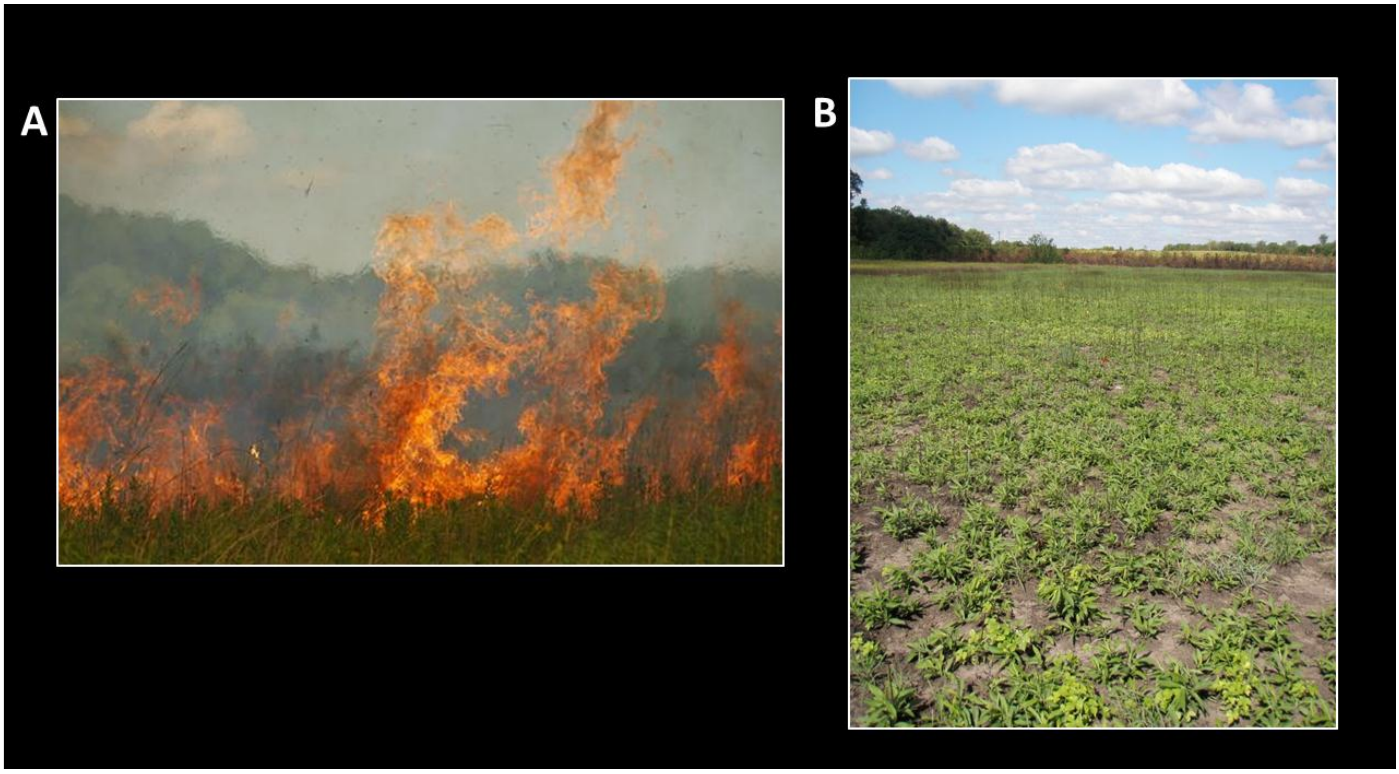
To assess the effect of the fire on invertebrates, the authors sampled transects in the burn and in an adjacent unburned area with similar vegetation. The data were based counts of larvae falling into "pitfall traps". The results consisted of larval counts from 11 August to 11 November 2012.

The **peak larval count occurred in October** (70 days post fire), when the average number of larvae was 18 times greater in the burned site (60 individuals) compared to the unburned site (3 individuals). While the majority of the larvae were identified as either corn earworm or tobacco budworm, 17% were other species not identified and not considered in the analysis.

The authors deduce that the **new growth occurring after the summer burn attracted ovipositing (egg-laying) females to the site**. Increased larvae occurring in the fall could lead to a greater population of pests in the following spring if conditions favor survival over the winter months. The authors reasonably conclude that "How large the actual impact of a mid-summer fire on agriculture could be, both in terms of crops and the area that would be affected, needs to be studied."

These results should be interpreted with caution as this study is based on a single site. Ideally, one should have at least two sites so that site-to-site variation could be estimated. This is because with only one site the possibility that differences between the burned and unburned areas that had nothing to do with the fire might account for the difference in larval cannot be statistically ruled out. But we are inclined to believe that fire effect is predominant, and proceed on that assumption.

This preliminary study **demonstrates the complexity of interactions that can occur with fire on the modern landscape, and presents how land management with prescribed fire must balance the benefits and risks.** Agriculturalists may conclude that they do not want summer burning in CRP or other prairie vegetation near crops. However, invertebrate conservationists might like to know what other species were in the 17% not identified, as these may be rare or desirable species that might justify summer burning.



Photos: (A) Wildfire burning at study site in July 2012 (Credit: Fay Jostes), and (B) Post-burn recovery of vegetation at study site at the time female moths were likely laying eggs (Credit: Tracy Evans).