RESUMEN

Efectos del fuego sobre la biodiversidad de artrópodos en el sur del Caldenal

Se estudiaron los efectos de los disturbios asociados al fuego sobre la entomofauna del suelo en el sur del Caldenal. Los efectos de los disturbios sobre los individuos pueden ser directos o indirectos y sus impactos se reflejan en las comunidades. Los efectos directos de un disturbio pueden ser desfavorables a drásticos sobre los organismos, o positivos, como la activación del crecimiento y de respuestas reproductivas. Los efectos indirectos de los disturbios resultan de la consecuencia en los organismos por la alteración del ambiente en el que habitan. El fuego es un disturbio natural en el Caldenal. Además, la entomofauna aporta funciones claves en este ecosistema, entre otras cosas: predación, herbivoría, dispersión de semillas, y descomposición de materia orgánica. Se estudió el efecto de distintas frecuencias de quemas controladas y el efecto post-fuego sobre la biodiversidad de artrópodos y, en especial de hormigas; también el efecto de fuego sobre la vegetación y, a su vez, la respuesta de los artrópodos y las hormigas. Por último, se evaluó el efecto de los cortafuegos –como perturbador drástico del suelo– sobre las hormigas más conspicuas del sistema. Los artrópodos y las hormigas presentaron una marcada estacionalidad y siempre se encontraron diferencias estadísticas significativas entre las parcelas quemadas y no quemadas. Se encontró que los artrópodos son altamente resilientes al fuego y a la modificación producida sobre la vegetación. Los meses de mayor riqueza de especies de hormigas reflejaron que una frecuencia de fuego intermedia favorece la diversidad, lo que sugiere el apoyo a la hipótesis del disturbio intermedio. En cuanto a los efectos sobre la vegetación los resultados son consecuentes con la hipótesis de retroalimentación positiva entre el fuego y las gramíneas (ciclo pasto/fuego). A su vez, los efectos de esta interacción sobre los artrópodos y particularmente sobre las hormigas, mostraron un aumento de la riqueza de órdenes y específica en función de la heterogeneidad de hábitats, antes y después de una quema controlada. Estos resultados son consistentes con la hipótesis de pirodiversidad, es decir la diversidad de las quemas –frecuencia, intensidad, estación de aplicación– aumenta la heterogeneidad de hábitats favoreciendo el establecimiento, supervivencia y reproducción de especies con distintos requerimientos promoviendo la diversidad. Por otro lado, se evaluó un disturbio drástico asociado al manejo del fuego, los cortafuegos, registrándose el establecimiento de especies dominantes, que potencialmente podrían afectar la dinámica de la comunidad de la entomofauna y la vegetación cercana. En resumen, se encontró que los artrópodos del suelo y, particularmente, las hormigas son resilientes al fuego que co-evolucionó con el sistema, aunque hay una severa pérdida de la diversidad cuando las perturbaciones son drásticas sin “memoria evolutiva”.

ABSTRACT

Effects of fire on the biodiversity of arthropods in the south of Caldenal

The effects of disturbances associated with fire on soil arthropods were studied in the south of the Caldenal. The effects of disturbances on individuals may be direct or indirect and their impacts are reflected in their communities. The direct effects of a disturbance may be unfavourable or drastic for the organisms, or positive, such as the activation of growth and reproduction. The indirect effects of distubances are caused by modification of the habitat. Fire is a natural disturbance in the Caldenal and the functions contributed by the insect fauna are key to this ecosystem: predation, herbivory, seed dispersal and decomposition of organic matter. The effect of different frequencies of controlled burns was studied, as well as the post-fire effect on the biodiversity of arthropods, particularly ants. The effect of fire on the vegetation and how this affected the arthropods and ants was also studied. Lastly the effect of fire breaks was evaluated –as a drastic disturbance to the soil– on the most comspicuous ants in the system. The arthropods and ants showed a marked seasonality and significant differences were always found between the burnt and unburnt plots. It was found that arthropods are highly resilient to fire and to the consequent modification of the vegetation. In the months of greatest species richness of the ants it was shown that an intermediate fire frequency favoured diversity, which agrees with the intermediate disturbance hypothesis. In regards to the effects of fire on the vegetation, the results are consistent with the hypothesis of positive feedback between fire and grass (grass/fire cycle). Moreover, the effects of this interaction on arthropods, and on ants in particular, showed an increase in richness in function of the heterogeneity of the habitat, before and after a controlled burn. These results are consistent with the hypothesis of pyrodiversity, *i.e.*, the diversity of fire –frequency, intensity, season of application–, as increases in the environmental heterogeneity favour the establishment, survival and reproduction of species with different requirements, which promotes diversity. Firebreaks, a drastic disturbance associated with the management of fire, were evaluated by recording the establishment of dominant species that might potentially affect the dynamics of the insect community and surrounding vegetation. In conclusion, it was found that soil arthropods and ants are resilient to fire since they underwent co-evolution within the system, although there is a severe loss of diversity when disturbances are more drastic, without “evolutionary memory”.

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