

Absence of effects on nutrient budgets after insect defoliation in a small *E. globulus* watershed in Galicia (NW Spain)

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Abstract

Nutrient export via streamflow after the defoliation by *Gonipterus scutellatus* Gill. in a *Eucalyptus globulus* Labill. watershed in Galicia (NW Spain) was monitored from 1999 to 2006. The effects of such defoliation on nutrients balance had not been previously evaluated.

Insect defoliation caused no significant changes in streamflow nutrient concentrations during the period of study compared with the pre-perturbation period and nutrient exports in streamflow were compensated via precipitation in all cases.

The results presented here show that in spite of the reduction in *E.globulus* growth caused by the defoliation, nutrient balances were positive, suggesting a minor impact in the soil-plant system nutrient budget.

Key words: eucalypts; nutrient balance; defoliation; *Gonipterus scutellatus*.

Resumen

Ausencia de efectos en los balances de nutrientes después de defoliación por insectos en una cuenca experimental de *E. globulus* en Galicia (NW de España)

Se ha desarrollado un estudio entre 1999 y 2006 para evaluar el efecto de la defoliación por *Gonipterus scutellatus* Gill. sobre la pérdida de nutrientes por escorrentía en una cuenca experimental de *Eucalyptus globulus* Labill. en Galicia (NW España). Esos efectos no habían sido evaluados hasta ahora.

La defoliación no causó variaciones significativas en las concentraciones de nutrientes durante el período de estudio en relación con el período pre-perturbación y las entradas de nutrientes por precipitación compensaron las salidas de nutrientes por escorrentía en todos los casos.

Los resultados que se presentan en este trabajo muestran que a pesar de la reducción en el crecimiento de *E.globulus* causado por la defoliación, los balances de nutrientes fueron positivos, sugiriendo un impacto menor en el balance de nutrientes del sistema suelo-planta.

Palabras clave: eucaliptos; balance de nutrientes; defoliación; *Gonipterus scutellatus*.

Introduction

Eucalyptus globulus Labill. covers about 175,000 ha in mono specific and 160,000 ha (Ministerio de Medio Ambiente, 2001) in mixed stands in Galicia (NW Spain), the area with the largest eucalypt plantations in Europe (Ruiz *et al.*, 2008). These eucalypt stands, characterized by their high growth rate (Ruiz *et al.*, 2008), are managed in short rotations (10-15 years) with mechanized skidding and intensive logging slash manipulation after clearcutting.

The Eucalyptus snout beetle, *Gonipterus scutellatus* Gill., is a generalist herbivore of *Eucalyptus* spp, both the snout beetle adults and larvae eat the leaves, buds and shoots of the eucalypt trees. It was found in NW Spain in 1991 (Mansilla, 1992) and now it has spread and become in a serious problem affecting the Galician eucalypt plantations (Mansilla *et al.*, 1995, 1996; Cordero *et al.*, 1999; Cordero and Santolamazza, 2000; Santolamazza *et al.*, 2006). Snout beetle can develop up to three generations each year (Santolamazza *et al.*, 2006), thus increasing its eucalypt defoliating capability.

Little is known about the effects of insect attacks on nutrient cycling in forested watersheds. Most studies of the effects of insect defoliation on watersheds nutrient

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Received: 02-07-10; Accepted: 03-05-11.