Improving Germination in Windmillgrass Ecotypes

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Abstract

Hooded windmillgrass *(Chloris cucullata* Bisch.) and shortspike windmillgrass (C. *subdolichostachya* Mud.) are native perennial grasses with potential for planting on highly erodible sites and on sites where introduced species are not desired. However, in both species, seeds are dormant resulting in poor germination. The objectives of this study were to evaluate effects of lemma and palea removal and caryopsis scarification on seed germination of 8 outstanding ecotypes selected in previous studies for survival and growth characteristics. Seed treatments were 1) whole seed, 2) naked caryopsis, 3) scarified naked caryopsis (30 s), 4) scarified naked caryopsis (50 s), and 5) scarified naked caryopsis (60 s). Germination conditions were 12 h dark 20°C and 12 h light 30°C. Seed lot viability varied from 55% to 62% for shortspike windmillgrass ecotypes and from 71% to 78% for hooded windmillgrass ecotypes. Initial germination index (MIR_{10}) of naked caryopsis for shortspike windmillgrass ecotypes ranged from 16.3 to 21.6, compared to range from 0.2 to 0.6 to whole seed; whereas hooded windmillgrass ecotypes MIR_{10} ranged from 30.6 to 33.0 to naked caryopsis, compared to range from 5.8 to 8.0 to whole seed. The greatest total germination ($P < 0.05$) was obtained with naked caryopsis for all ecotypes and the scarification treatments did not have a positive effect on this parameter. As scarification time increased the total germination decreased. Lemma and palea removal improved ($P < 0.05$) total germination for all studied ecotypes.

Resumen

Flooded windmillgrass *(chloris cuculIata* Bisch.) y shortspike windmillgrass (C. *subdolichostachya* Muell.) son pastos nativos con alto potencial para establecerse en sitios altamente degradados y/o en areas donde las especies introducidas son no deseadas. No obstante, en ambas especies la semdla presenta dormancia ocasionando pobres resultados en germinación. Los objetivos de este estudio fueron evaluar los efectos de remotion de la lemma y palea, y escarificación del cariopsis sobre la germinatión de semillas en 8 ecotipos previamente seleccionados por caracteristicas de sobrevivencia y crecimiento. Los tratamientos a la semilla fueron 19) semilla completa, 21 cariopsis desnudo, 3) cariopsis desnudo escarificado (30 s), 4) cariopsis desnudo escarificado (50 s), y .5) cariopsis desnudo escarificado (60 s). Las condiciones de germinatión fueron 12 h obscuridad 20°C y 12 h luz 30°C. La via bilidad des las semi Has varió de 55% a 62% para los ecotipos de shortspike y dc 71% a 78% para los ecotipos de hooded. El indite de germinación initial (MIR_{10}) de cariopsis desnudo para los ecotipos de shortspike varió de 16.3 a 21.6 comparado con un tango de 0.2 a 0.6 en semilla semilla completa; mientras que en ecotipos de hooded windmillgrass el MIR_{10} vario de 30.6 a 33.0 en cariopsis desnudo comparado con tin rango de .5.8 a 8.0 en semilla completa. La mayor germinación total ($P < 0.05$) fue obtenida con cariopsis desnudo en todos los ecotipos y los tratamientos de escarificación no tuvieron efecto positivo sobre este parámetro. Conforme el tiempo de escarificación incremento, la germinación total disminuyó. La remoción de lemma y palea mejoró ($P < 0.05$) la germinación total en todos los ecotipos estudiados.

Key Words: Native grasses, dormancy, caryopsis, scarification, *Cbloris cucullata, Chloris subdolichostachya*

INTRODUCTION

Hooded windmillgrass (*Chloris cucullata* Rise h.) and shortspike windmillgrass (C. subdolichostachya Much.), are warm-season perennial grasses (Gould 1975; Hatch et al., 1999). They can be found in prairies on sandy or gravelly soils, and

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