

EFFECT OF LIGHT INTENSITY AND HERBICIDE MIXTURES ON PRICKLY SIDA

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Introduction

Prickly sida (*Sida spinosa* L.) is a major weed of several crops including citrus groves in Florida. Inconsistent results with glyphosate have been observed in groves depending upon herbicide application time, rates and growth stages of prickly sida. Shading on weeds by mature citrus trees may have an effect on weed growth compared to non-shaded areas around young citrus trees, which may require differential rates of herbicide for effective control of weeds with POST herbicides. Information on prickly sida growth under different shading (light levels) and herbicide efficacy is limited, necessitating the present study.

Objectives

- >To assess the growth and development of prickly sida under different light levels
- >To evaluate efficacy of Krovar 1 and glyphosate applied alone & in tank mix on prickly sida under different light levels

Materials & Methods

Prickly sida was sown in 1 gal pot using Candler fine sand under different light levels and thinned to 5 plants per pot after emergence. Different light levels were obtained by using horticultural grade shade cloth; light levels and air temperature were recorded using WatchDog data loggers from Spectrum Technologies. Plants were watered as required. Krovar 1 at 1 and 2 kg a/ha alone and tank mixed with glyphosate at 2 kg a/ha and glyphosate alone at 2 kg a/ha were sprayed using a track sprayer fitted with flat fan spray nozzle delivering 190 L/ha volume at 140 kPa. A non-ionic surfactant (X-77) at 0.25% was added to Krovar only treatments as glyphosate (Roundup UltraMax) already was formulated with a surfactant. Control treatments were maintained for each light level.

Chlorophyll fluorescence (Fv/Fm) was recorded 24 and 48 h after herbicide spraying using OSI-FL, Modulated Fluorometer from Opti-Sciences; where Fv = variable fluorescence (Fm-F0), Fm = fluorescence level when Qa is transiently fully reduced, and F0 = fluorescence level when plastoquinone electron acceptor pool (Qa) is fully oxidized. Fv/Fm is an arbitrary unit and is proportional to the quantum yield of photochemistry and highly correlated with the quantum yield of net photosynthesis.

Plant height and visual mortality (0-100 scale) were periodically recorded. Fresh weight of plants was recorded after 5 WAT and data subjected to ANOVA.

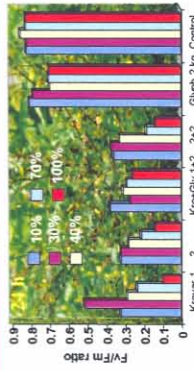


Fig. 1. Chlorophyll fluorescence in prickly sida plants, 24 h (L) and 48 h (R) after spraying

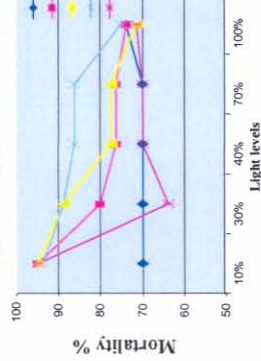


Fig. 2. Visible mortality of prickly sida at 2 (L) and 3 (R) WAT as influenced by light levels and herbicide treatments

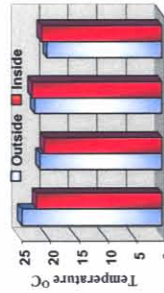


Fig. 3. Effect of shade (light levels) on outside & inside temperatures in the mini-greenhouses

Fig. 5. Regenerating prickly sida plants at 40% light level with glyphosate 2 kg a/ha, 5 WAT



Fig. 6. Effect of light levels on plant height of prickly sida before and 3 WAT



Fig. 7. Effect of light levels and herbicide treatments on prickly sida mortality 7 DAT



Fig. 4. Effect of light levels on growth and mortality of prickly sida by herbicide treatments 3 (L) & 4 (R) WAT

Conclusions

- Plant height was significantly higher at 70% light intensity than higher or lower light levels; the dry matter accumulation, however, was higher with 100% light intensity at 5 WAT compared to lower light intensity.
- All the herbicide treatments significantly reduced prickly sida height, 3 WAT compared to control plants.
- Reduction in chlorophyll fluorescence was higher at increasing light intensity. Among herbicide treatments, highest reduction in chlorophyll fluorescence was recorded at 2 kg a/ha of Krovar 1 followed by its mixture with glyphosate and lowest with glyphosate alone at 24 and 48 HAT.
- Visible mortality was higher at 10% light level than 100% observed at different durations. Krovar at 2 kg a/ha alone or tank mixed with glyphosate provided greater mortality at 2 WAT than Krovar alone at 1 kg or glyphosate 2 kg a/ha. Plants treated with glyphosate alone re-generated 5 WAT.