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Control of Carolina redroot (Lachnanthes caroliana) in cranberry with preemergence herbicides

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CONTROL OF CAROLINA REDROOT (*LACHNANTHES CAROLIANA*) IN CRANBERRY WITH PREEMERGENCE HERBICIDES

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Introduction

Effective weed control is a key component of cranberry production systems. Among tough-to-control perennial weed species, Carolina redroot (*Lachnanthes caroliana* Lam.) has been an increasing source of concern for New Jersey cranberry growers (Fig. 1). Carolina redroot is an herbaceous, monocotyledonous member of the *Haemodoraceae* family, easily recognizable by the orange to red coloration of its roots and rhizomes. Carolina redroot is distributed from Louisiana to Massachusetts and inhabits wet savannas, pocosin edges, coastal plain ponds, ditches and wet sandy disturbed grounds (Weakley 2011). Information regarding its control with preemergence (PRE) herbicides are limited to studies conducted in North Carolina (Meyers et al. 2013) where flumiozaxin, hexazinone, *s*-metolachlor, and terbacil were tested in a greenhouse trial. Results showed that hexazinone at 2.2 kg ai ha^{-1} and terbacil at 1.8 kg ai ha^{-1} provided 64 and 68% root/rhizome control, respectively. Hexazinone at 2.2 kg ai ha^{-1} provided the greatest Carolina redroot shoot control at any time. However, none of the herbicides tested in this study are actually labelled for weed control in cranberry, stressing the need for assessing the weed control and crop damage potential of PRE herbicides labelled for use in cranberry beds.

Objectives

This study was conducted to evaluate the impact of three different PRE herbicides applied at various labelled rates on:

- Carolina redroot control, density and above ground biomass;
- cranberry injury or stunting.

Material and Methods

- Field experiments conducted in 2017 at Chatsworth, NJ (Fig 1).
- Cranberry variety: Early Black.
- Randomized complete block design including a non-treated check (Fig 3).
- Treatments included 3 pre-emergence herbicides:
  - ✓ norflurazon (Evital 5G) at 560, 1,120, 2,240, 4,480 g ai ha^{-1};
  - ✓ napropamide (Devrinol DF-XT) at 6,720 g ai ha^{-1};
  - ✓ dichlobenil at 2,240 and 4,480 g ai ha^{-1}.
- Treatments applied on April 28, 2017.
- Carolina redroot density, Carolina redroot control, and cranberry injury were rated at 28, 42, 56, and 83 days after treatment (DAT). Carolina redroot above ground biomass was collected at 105 DAT.
- Data analyzed in SAS 9.4 using PROC UNIVARIATE to remove outliers then PROC GLM and Fisher's Protected LSD ($\alpha = 0.05$) to determine significance and separate means.

Figure 3. Overview of the experimental site in Chatsworth, NJ.

Figure 1. Blooming Carolina redroot in cranberry bog.

Figure 2. Leaf chlorosis caused by norflurazon herbicide.

Figure 4. Carolina redroot control 83 DAT

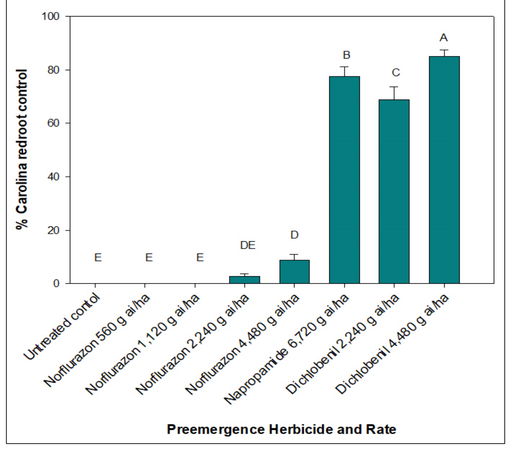


Figure 5. Carolina redroot density 83 DAT

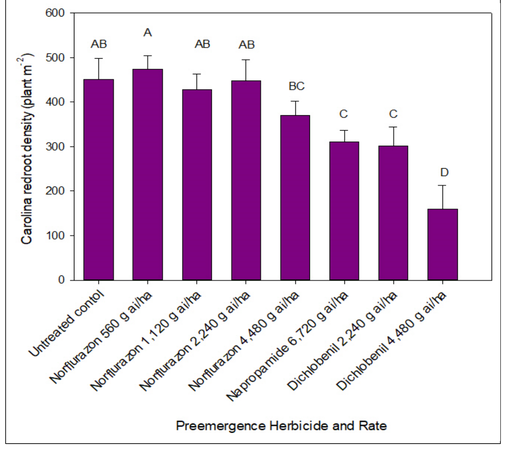


Figure 6. Cranberry injury 83 DAT

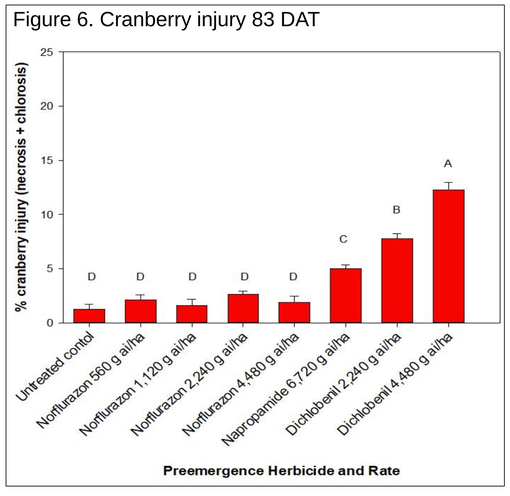
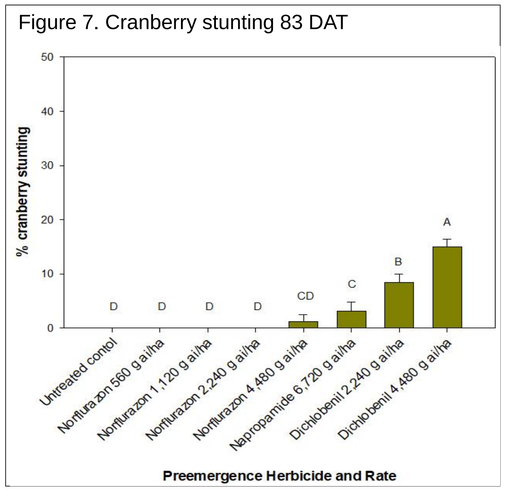


Figure 7. Cranberry stunting 83 DAT



Results and Discussion

- Norflurazon applied at 560, 1,120, 2,240, and 4,480 g ai ha^{-1} did not provide more than 9% control of Carolina redroot at any rating time (Fig.4). Higher levels of Carolina redroot injury, mostly in the form of leaf chlorosis (Fig. 2), were noted for norflurazon at 1,120, 2,240, and 4,480 g ai ha^{-1} than for other treatments (data not shown).
- Carolina redroot control with napropamide was 73% 28 DAT and increased to 78% by 83 DAT. Dichlobenil applied at 2,240 or 4,480 g ai ha^{-1} provided the greatest Carolina redroot control with 89 and 99%, respectively, at 28 DAT. However, control declined by 83 DAT with 69 and 85, respectively (Fig 4). Carolina redroot counts confirmed visual control ratings with similar density 83 DAT for norflurazon at any rate and the untreated control (440 plants m^{-2} in average) whereas napropamide and dichlobenil at 2,240 g ai ha^{-1} reduced Carolina redroot density by 32% and dichlobenil at 4,480 g ai ha^{-1} by 65% (Fig. 5).Carolina redroot shoot biomass 105 DAT was reduced by 66% with napropamide and dichlobenil at 2,240 g ai ha^{-1}, and by 90% with dichlobenil at 4,480 g ai ha^{-1} (data not shown).
- Application of dichlobenil resulted in higher cranberry injury, mostly chlorosis, and stunting than norflurazon or napropamide. Dichlobenil at 4,480 g ai ha^{-1} caused 19% injury 40 DAT. Level of damage remained higher for this treatment 83 DAT with 12% injury(Fig. 6) and 15% stunting (Fig. 7).

Conclusion and Future Research

- ➢ These results highlight the interest in using napropamide for efficient Carolina redroot control while minimizing damages to cranberries.
- ➢ Yield and fruit quality data will be collected for assessing the impact of visual cranberry injury noted with dichlobenil and napropamide on fruit production.
- ➢ Higher labeled rates of norflurazon will be tested in 2018.

References

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Meyers SL, KM Jennings, DW Monks, DL Jordan, and JR Ballington. 2013. Effects of PRE and POST Herbicides on Carolina Redroot (*Lachnanthes caroliniana*) Growth. Weed Technol. 27:747-751.