

# Influence of Henbit and Purple Deadnettle Density on Plant Biomass and Soybean Cyst Nematode Reproduction

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## Introduction

Soybean cyst nematode (SCN) can cause significant soybean yield loss even without evidence of above ground symptoms. Winter annual weeds are an increasing problem in fields due to decreased tillage and reduced use of residual herbicides (Nice and Johnson 2005). Winter annual weeds such as purple deadnettle and henbit have been shown to be hosts to SCN. In Indiana 93% of fields surveyed that were infested with SCN also had winter weed hosts (Creech and Johnson 2006). No studies have been published that evaluate intraspecific competition between purple deadnettle and henbit and if weed density of other hosts influences SCN population density.

Figure 1 and 2: SCN cyst and purple deadnettle in a field after harvest



## Objective

The objective of this greenhouse experiment was to determine the effect of purple deadnettle and henbit density on SCN reproduction and plant growth.

## Materials and Methods

Purple deadnettle, henbit, SCN-resistant soybean ('PI437654'), and SCN susceptible soybean ('Williams 82') were planted in pots (11 cm by 14.5 cm). Purple deadnettle and henbit were germinated in petri dishes on filter paper dampened with 0.2% KNO<sub>3</sub> at 24 C. Purple deadnettle and henbit were thinned to one, three, five, or seven plants per pot after emergence, and soybean was thinned to one plant per pot. Pots were inoculated two weeks after planting with 10,000 SCN eggs (HG type 2.5.7). Plants were grown in a greenhouse at 24 ± 5 C at a 14-h photoperiod. Six weeks after inoculation plant stem counts were recorded, then plants were cut at the soil surface and oven dried. Cysts were collected from soil and crushed to obtain SCN egg counts. This experiment was a two-factor factorial in a randomized complete block design with six replications. There were 10 plant density combinations, two SCN levels, and the experiment was repeated.

## Literature Cited

Creech, J.E., and W.G. Johnson. 2006. Survey of broadleaf winter weeds in Indiana production fields infested with soybean cyst nematode (*Heterodera glycines*). *Weed Technol.* (Accepted - In Press)  
Nice, G., and B. Johnson. 2005. Indiana's top ten most problematic weeds. *Purdue University Weed Science Extension Bulletin*. Web page: <http://btny.purdue.edu/weedscience/2005/topten05.pdf>. Accessed Oct. 2006.

## Materials and Methods cont.

SCN cyst and egg counts were log<sub>10</sub> transformed prior to analysis. Means were separated using Fishers protected LSD at P= 0.05. Backtransformed data are presented for clarity.

## Results and Discussion

### Plant Biomass

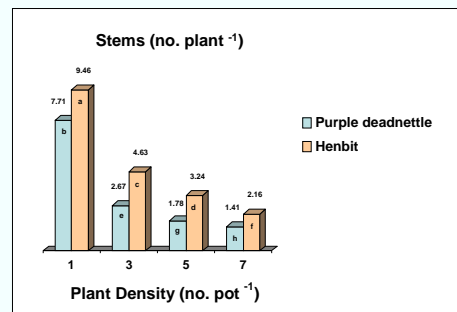


Figure 3: Influence of plant density on stem count. Henbit produced more stems than purple deadnettle at all plant densities. Within each species, as density increased stem number per plant decreased. Also, as plant density increased, dry weight per plant decreased (Data not shown). Bars with the same letter are not significantly different.

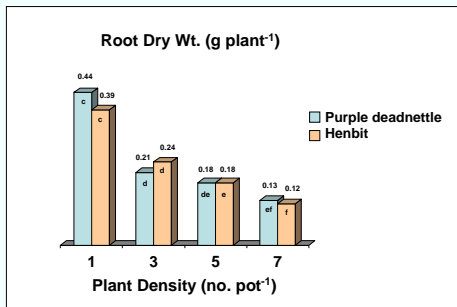


Figure 4: Influence of plant density on root dry weight. Root biomass per plant was highest at low plant densities and lowest at high plant densities. Root biomass was similar between species at each plant density. Bars with the same letter are not significantly different.

## Results and Discussion cont.

### SCN Reproduction

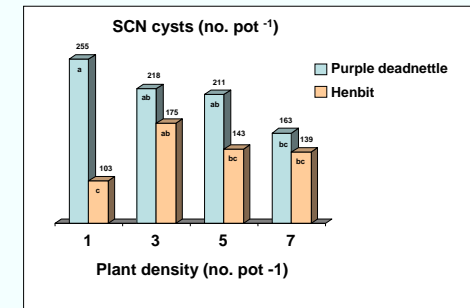


Figure 5: Influence of plant density on SCN cysts. Purple deadnettle was a better host for SCN than henbit with one plant per pot but similar when henbit and purple deadnettle density were three and seven plants per pot. Bars with the same letter are not significantly different.

## Conclusions

Henbit stem number was inhibited less than purple deadnettle due to intraspecific competition.

Root weight decreased per plant as plant density increased.

Purple deadnettle is a better host for SCN than henbit at low densities.

SCN cyst and egg production was influenced by weed density, but was species specific.

- High levels of SCN occurred on purple deadnettle at low or moderate weed densities
- High levels of SCN occurred on henbit at moderate or high weed densities

For SCN management purple deadnettle should be managed more aggressively at low densities than henbit.

## Acknowledgements

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