
Soybean Cyst Nematode Development on Purple Deadnettle Under Selected Winter Temperature Regimes

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Field in Knox Co., IN, Fall 2003

Soybean Cyst Nematode (SCN)

- Winter annual weeds as hosts of SCN (Venkatesh et al. 2000)



- Microscopic round worm
- Cysts contain up to 600 eggs
- Found in most soybean growing regions of U.S.
- In 2002, estimated yield losses in U.S. were \$783.8 million (Wrather et al. 2003)

Venkatesh et al. 2000. Weed Technol. 14:156-160.

Wrather et al. 2003. Plant Health Progress doi:10.1094/PHP-2003-0325-01-RV.

SCN Management

1. Crop Rotation
2. SCN Resistant Varieties
3. ***Winter weed management?***



SCN on Purple Deadnettle

- Sample purple deadnettle in December 2004
 - Field in northern Indiana
 - No cysts
 - Ave. 22 juveniles/plant
- What happens to these juveniles?
- ***Two scenarios***
 1. Killed by winter temperatures
 - SCN juveniles die when frozen (Slack et al. 1972)
 2. Overwinter and reproduce in the spring

Objective

- To determine the fate of SCN juveniles inside the roots of purple deadnettle at the onset of winter

Growth Chamber Experiment

- Purple deadnettle
- Conetainers[®]
- 3:1 sand/soil mix
- ~3000 SCN eggs
- RCBD
- 5 replications
- 3 experimental runs

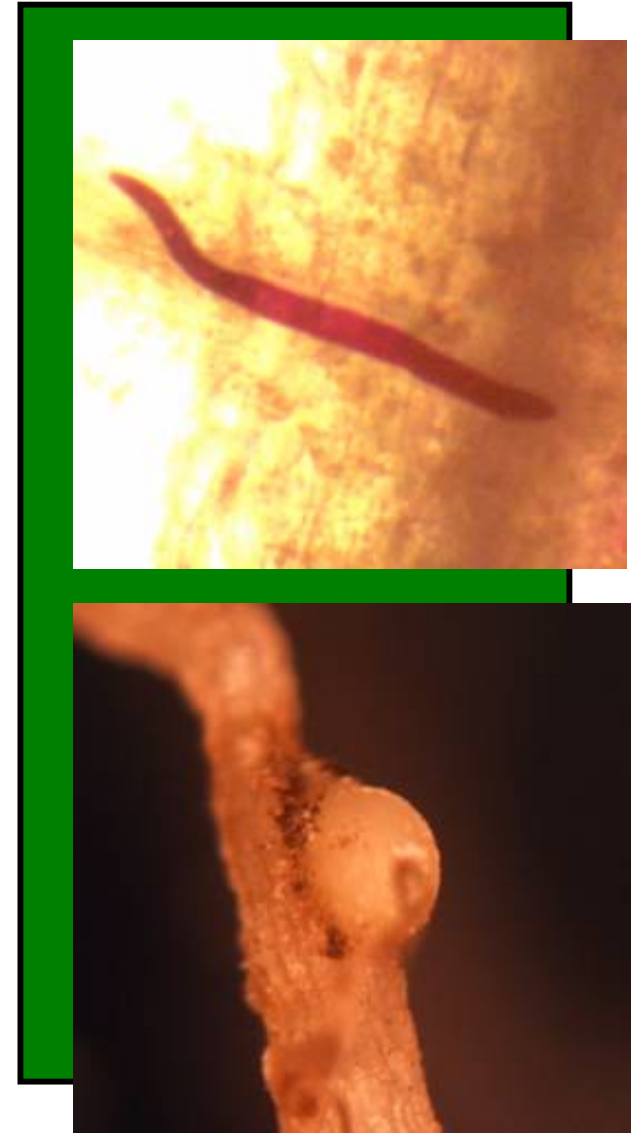


Temperature Regimes

- *Infection period*
 - 20°C for 20 days
 - *Temperature Treatment*
 - 10 or 20 days (10D and 20D)
Growth Chambers at 0, 5, 10, 15, 20°C
 - *Post-treatment growth period*
 - 0 or 20 days at 20°C
 - Plants harvested and SCN development determined
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Measurements

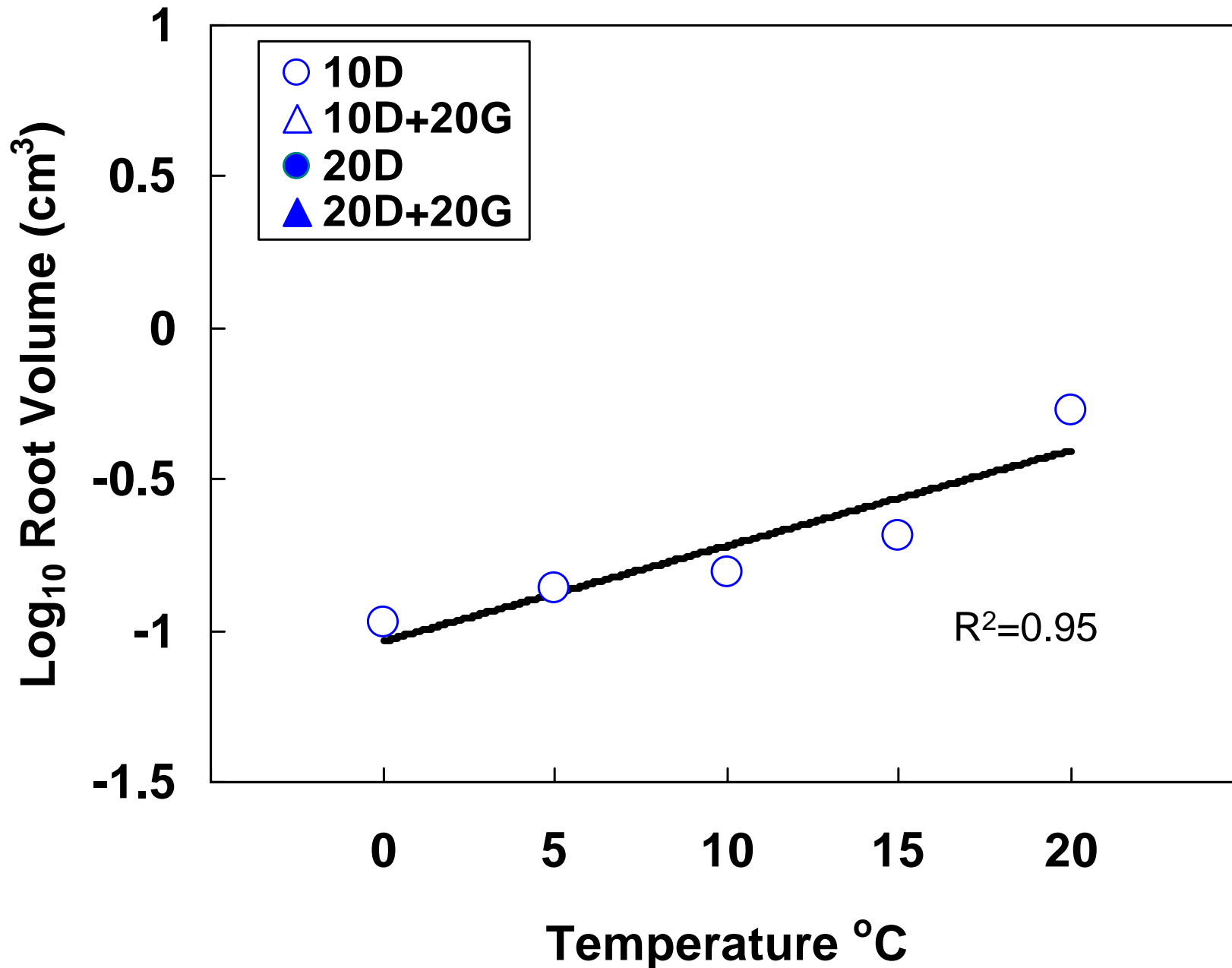
- Purple deadnettle
 - Root volume
- SCN
 - Juveniles
 - Young Cysts
 - Mature Cysts



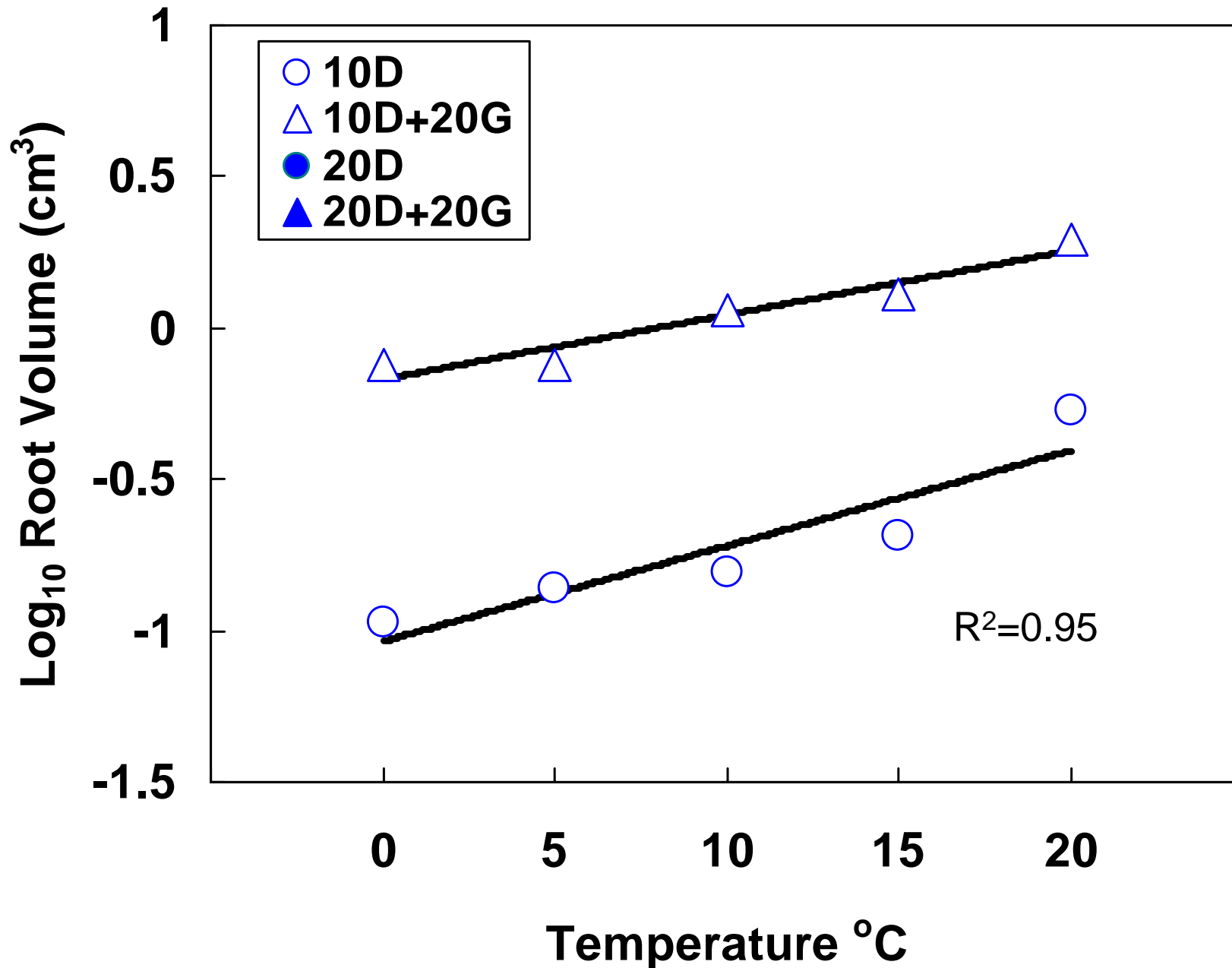
Data Analysis

- All means were log-transformed prior to ANOVA
 - 3 experimental runs were combined into a single analysis and random error variances were pooled wherever possible
 - Temperature main effects and interactions were partitioned into orthogonal polynomial contrasts
 - Regression was performed according to the significant orthogonal contrasts.
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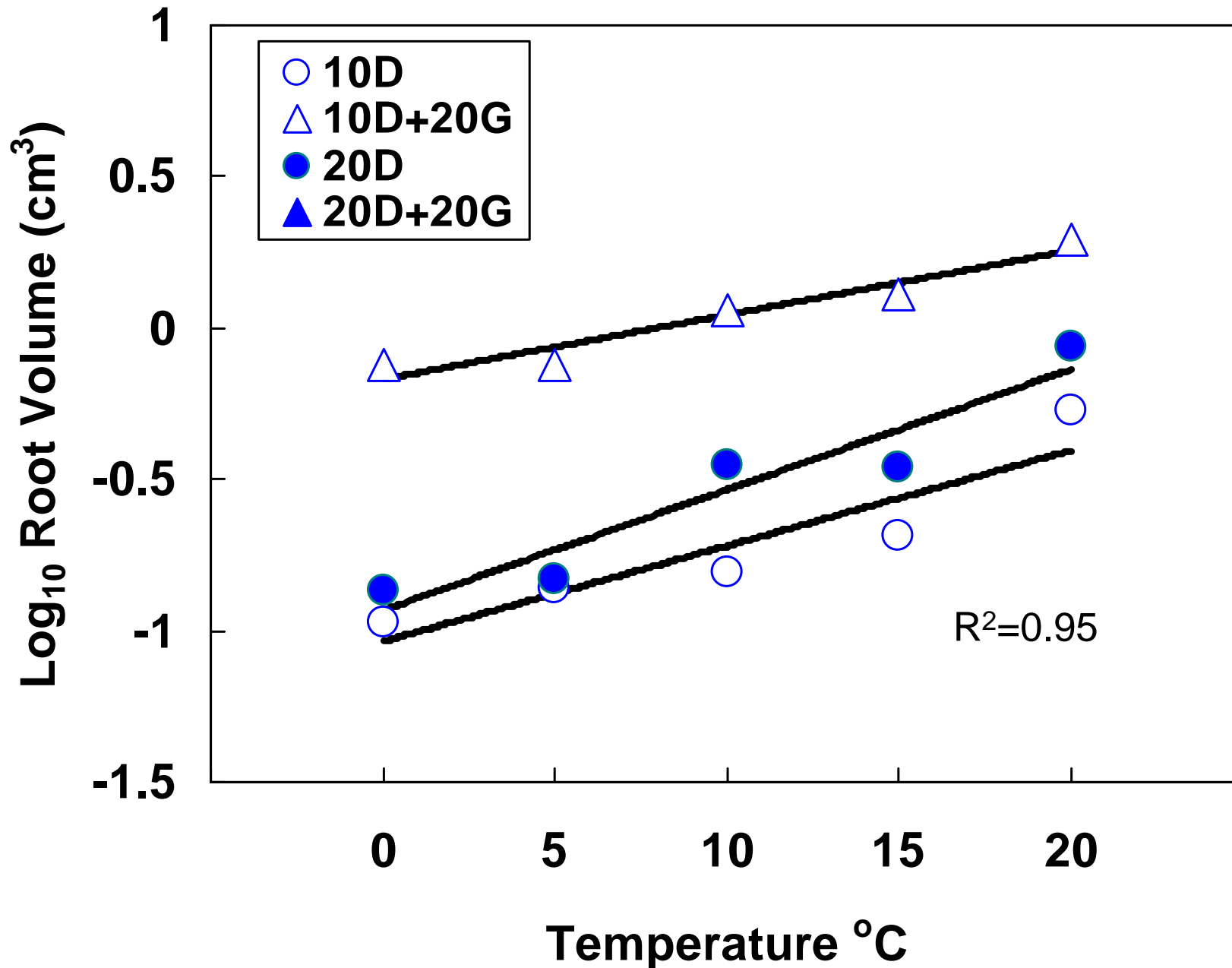
Purple Deadnettle Root Volume



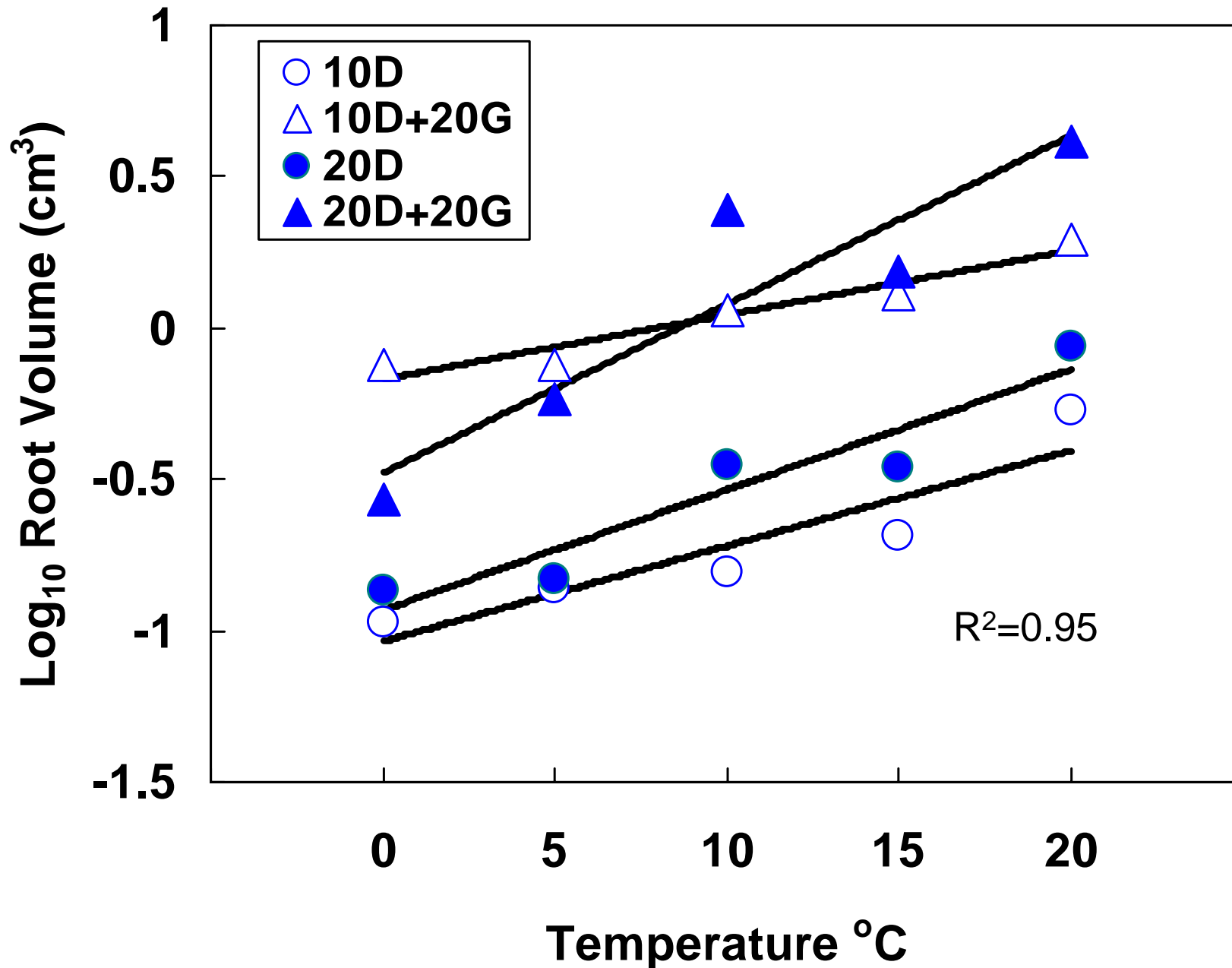
Purple Deadnettle Root Volume



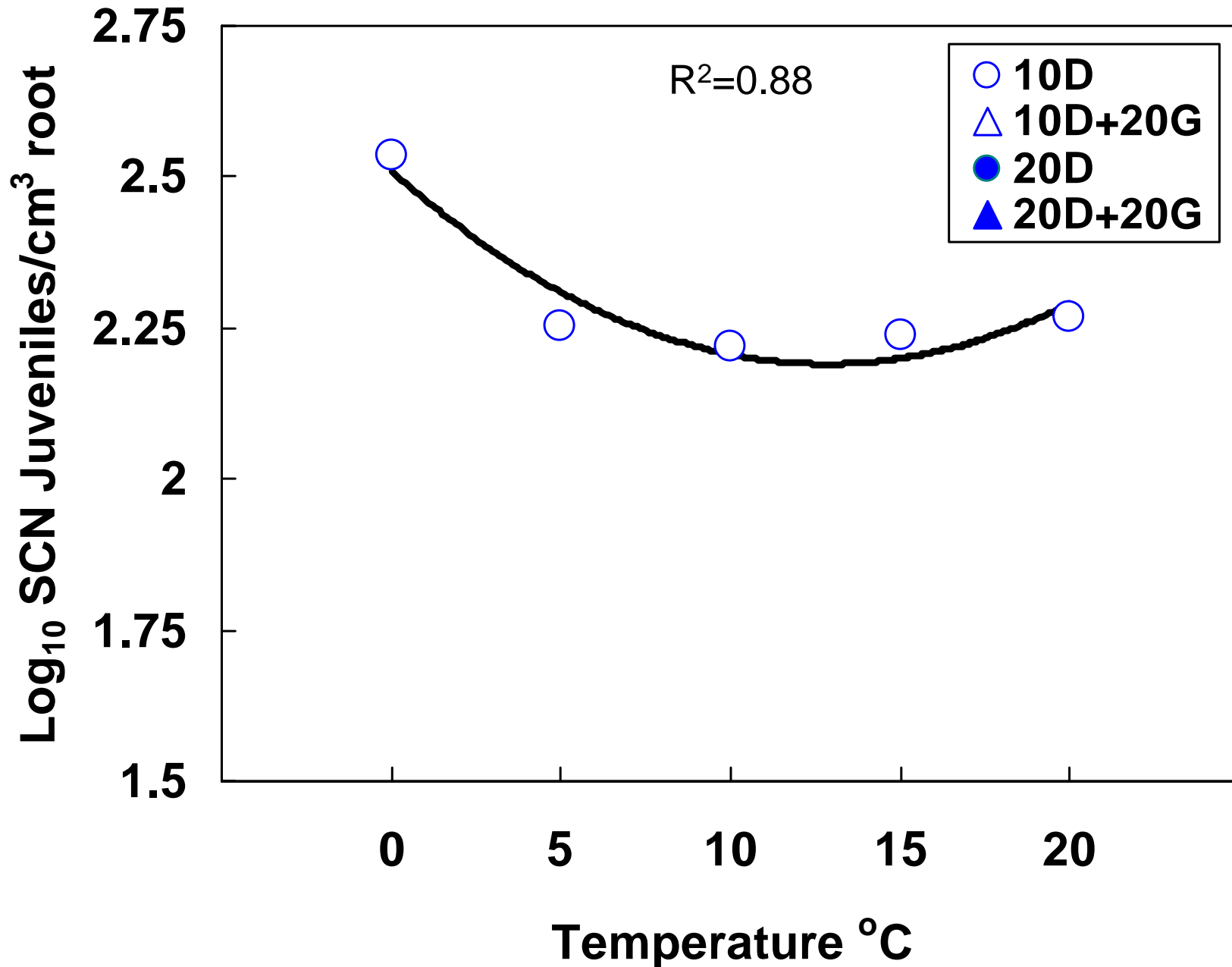
Purple Deadnettle Root Volume



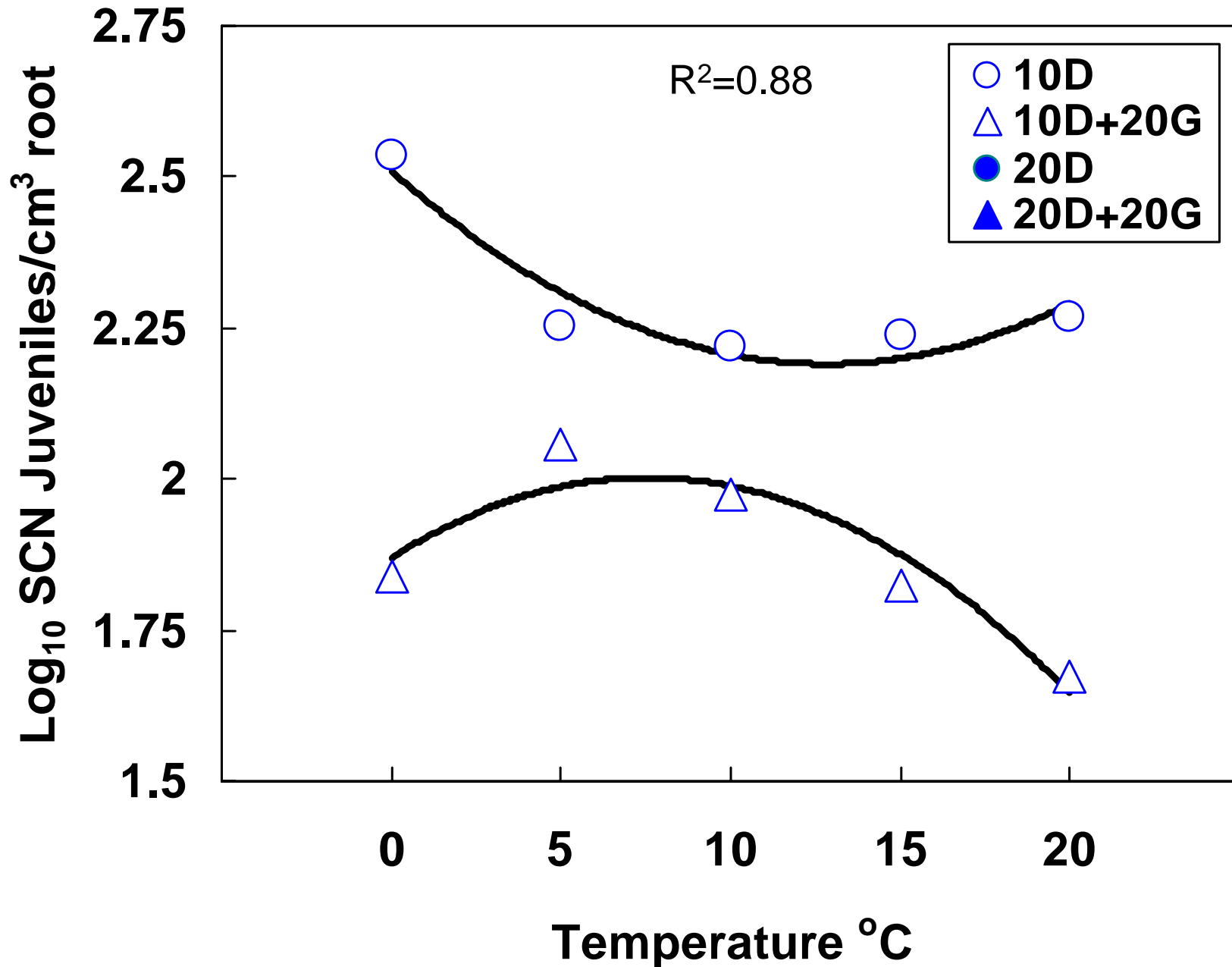
Purple Deadnettle Root Volume



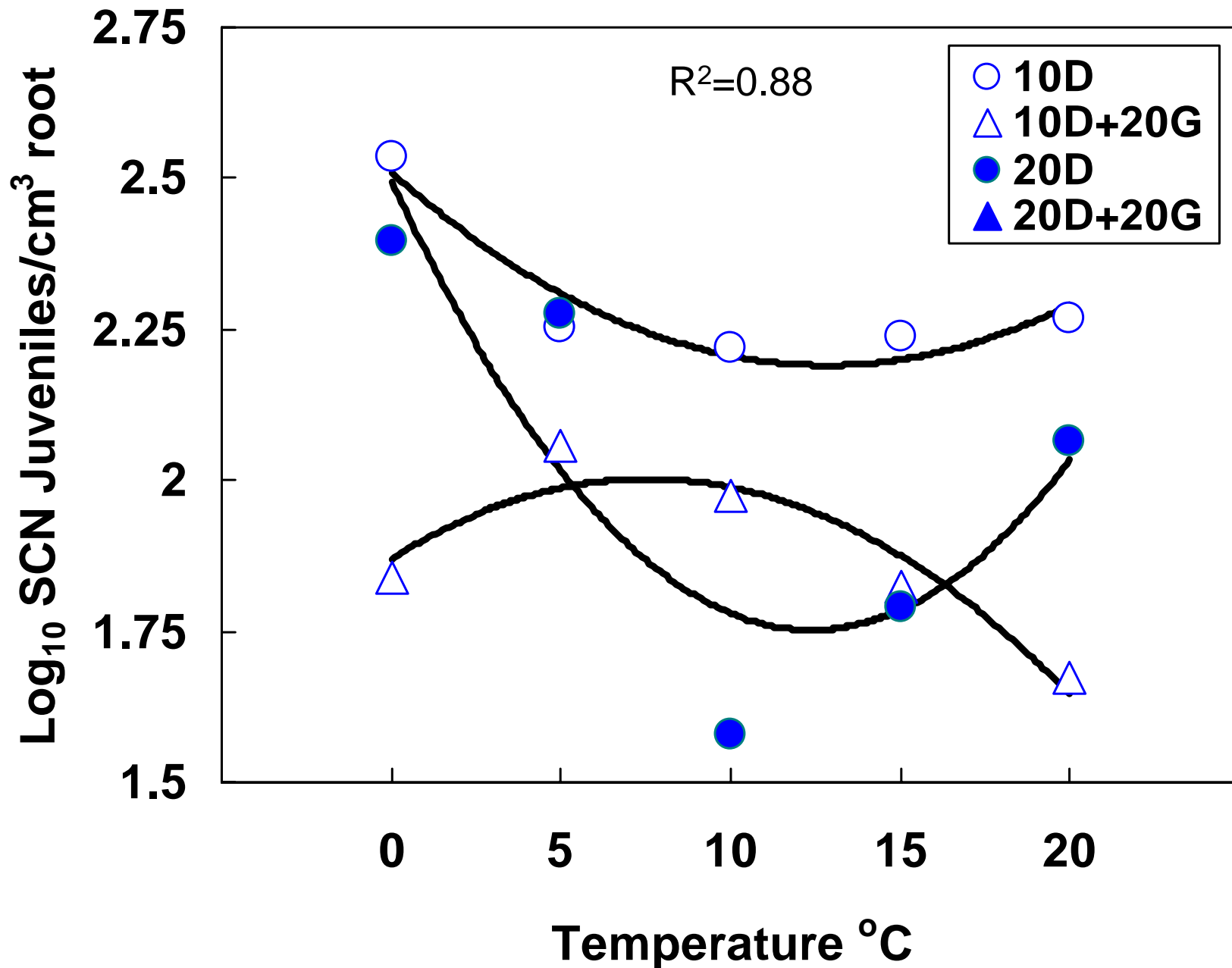
SCN Juveniles on Purple Deadnettle



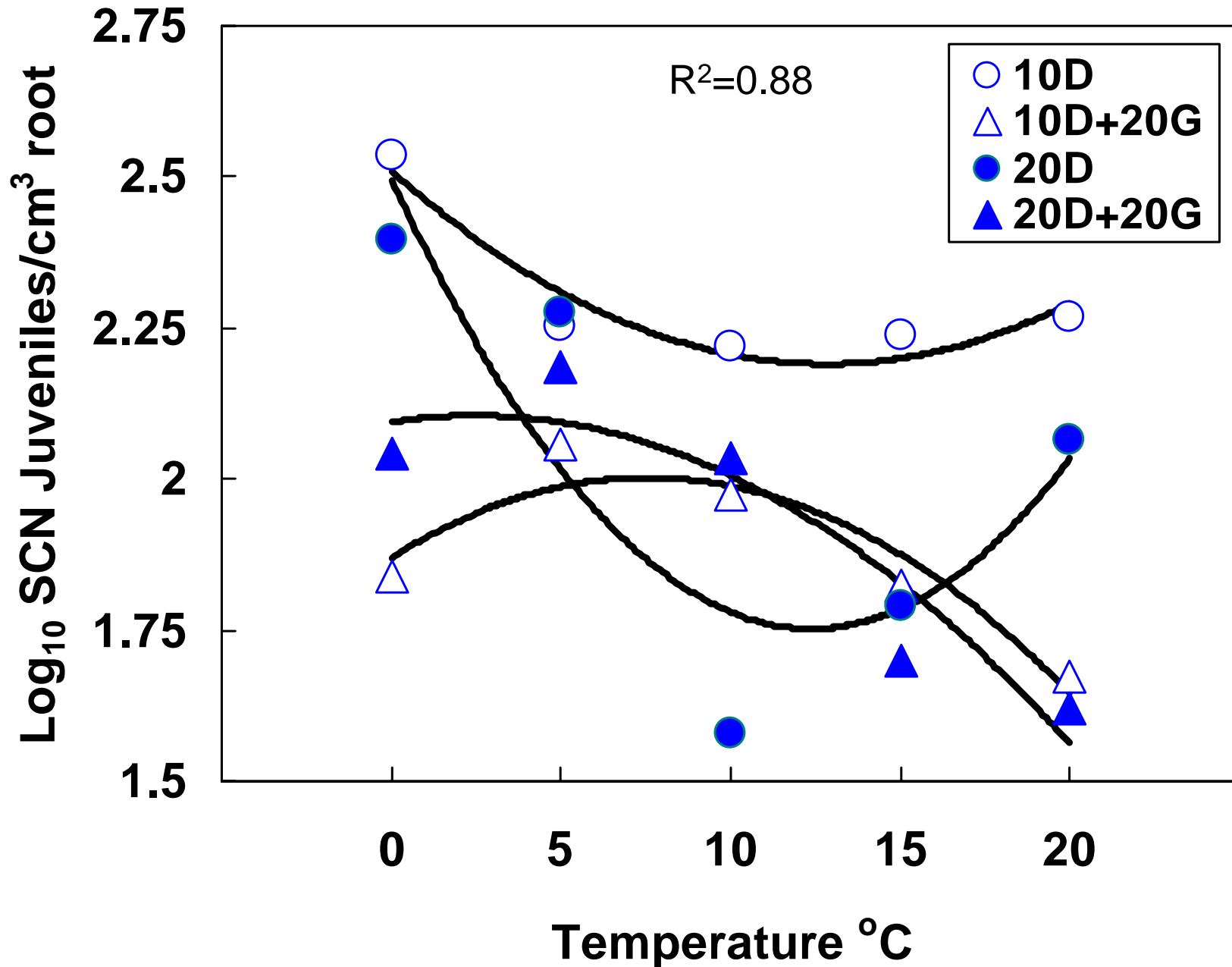
SCN Juveniles on Purple Deadnettle



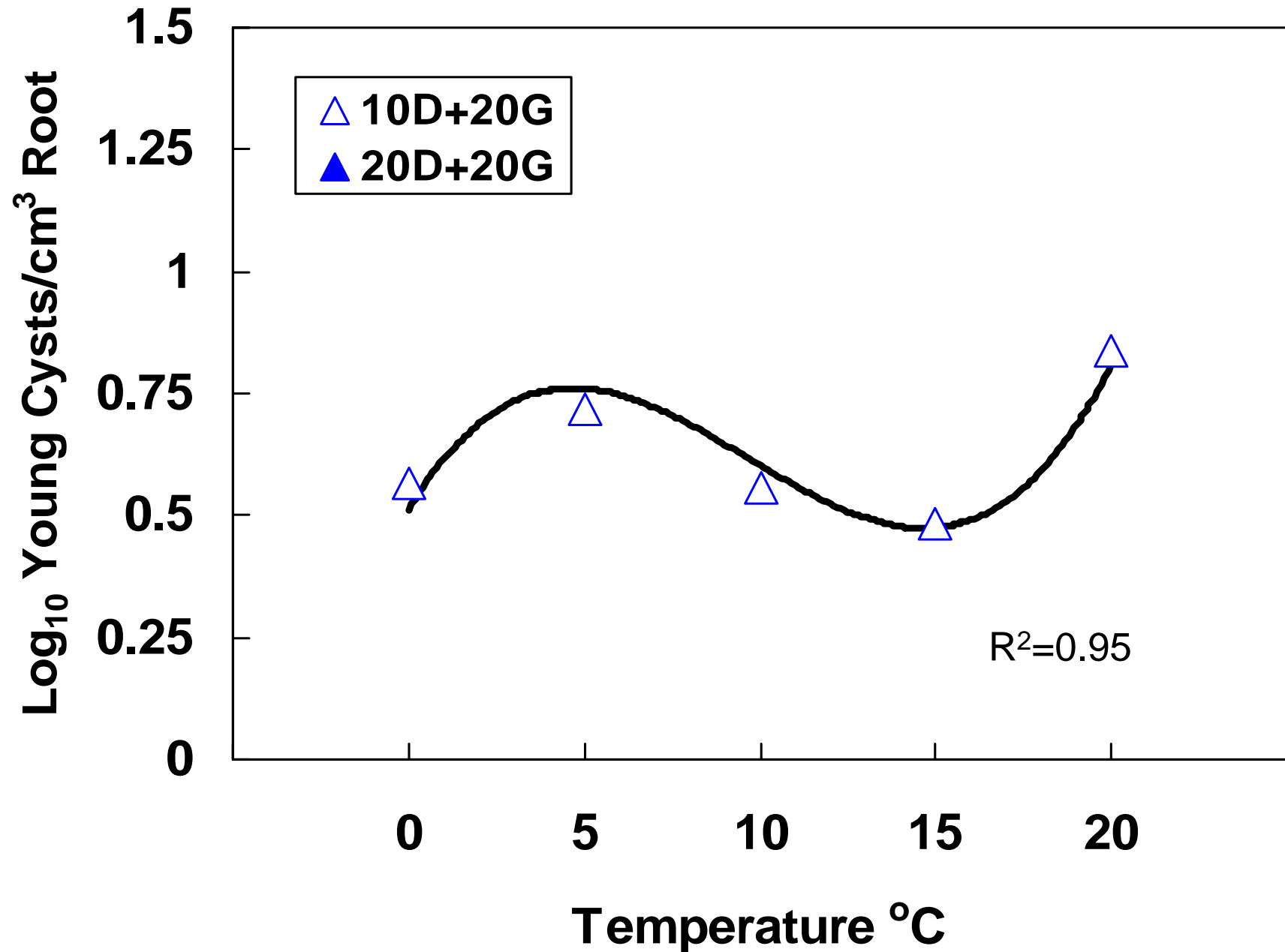
SCN Juveniles on Purple Deadnettle



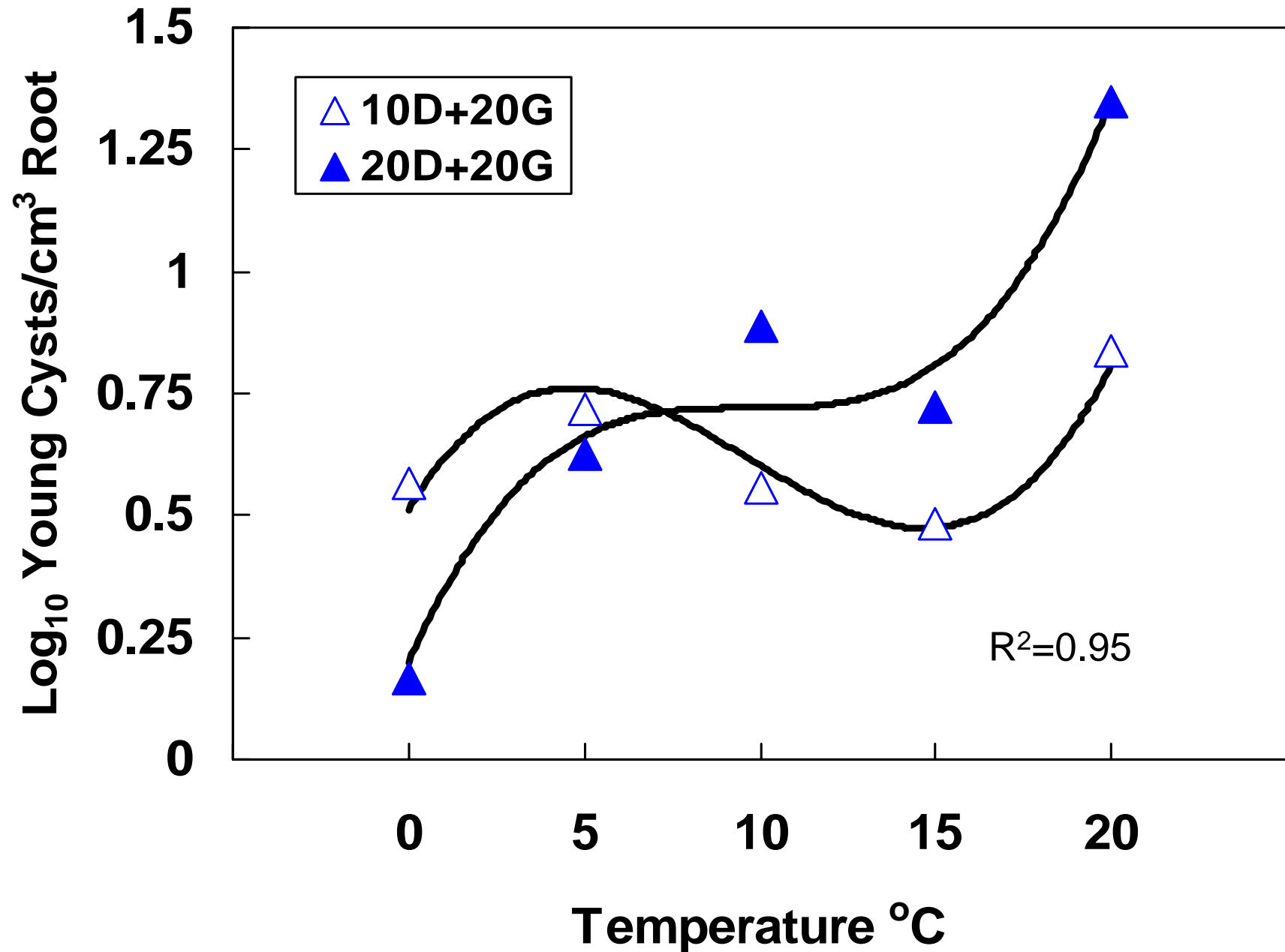
SCN Juveniles on Purple Deadnettle



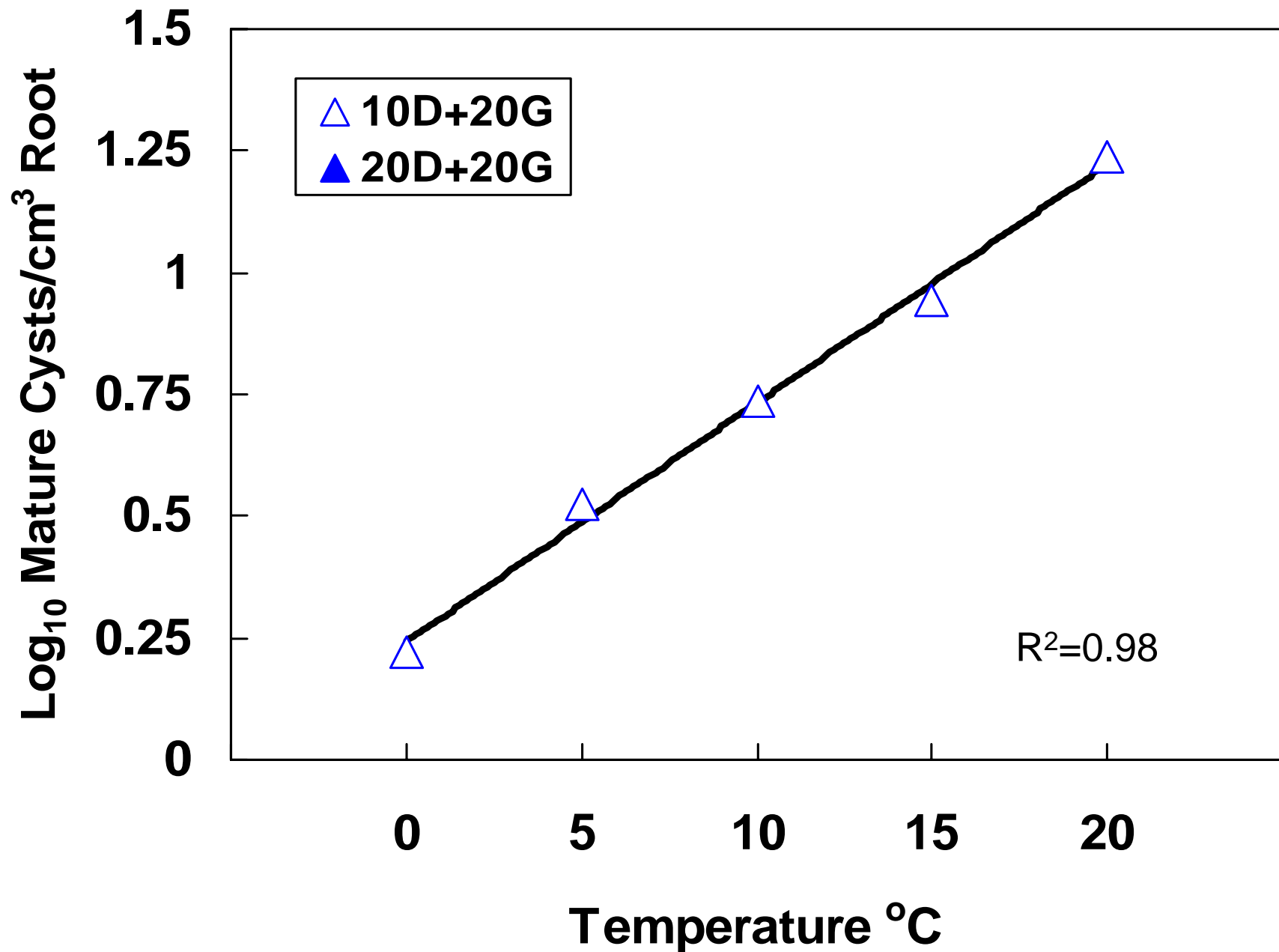
Young SCN Cysts on Purple Deadnettle



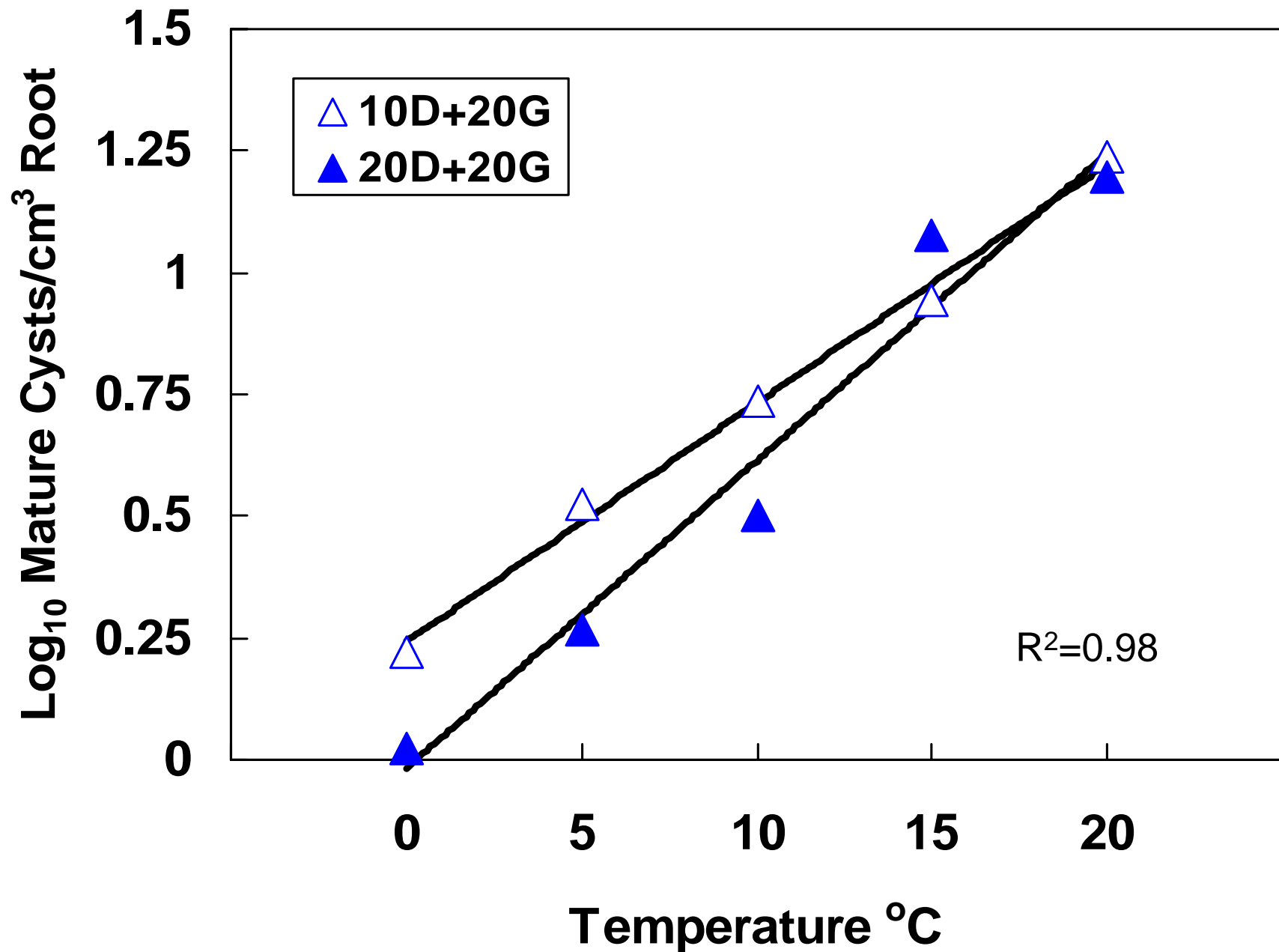
Young SCN Cysts on Purple Deadnettle



Mature SCN Cysts on Purple Deadnettle



Mature SCN Cysts on Purple Deadnettle



Conclusions

- Reproduction occurred in all temperature regimes examined
- SCN can survive cold weather better than previously thought
- What happens to SCN juveniles inside the roots of a winter annual at the onset of winter?
 1. Killed by winter temperatures
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- Winter weed management may be necessary in situations where the fall or spring winter weed growing period alone is not sufficient for SCN reproduction

