

Pine Shoot Beetle Biological Control Project

PROJECT UPDATE

Produced by PPQ Plant Protection Laboratories, Niles Biological Control Center February 1996 (#3)

This is the third issue of the *Project Update* for the Pine Shoot Beetle (PSB) Biological Control Project--our first issue for 1996. We hope that you found the previous issues informative. As always, we appreciate receiving your comments and suggestions for improving this document.

ADMINISTRATIVE

1996 FIELD ACTIVITIES (*Dave Prokrym*). PPQ will conduct the pre-release survey for native natural enemies in four states: **Indiana, Michigan, New York and Ohio**. The number of sites per state are as follows: IN-4, MI-6, NY-3, OH-6. Field personnel will prepare the site by placing 5 trap logs per site by March 1, 1996. A second batch of 5 logs will be placed towards the end of the PSB flight and developmental period. Sites will be selected using the following criteria:

- The site is located in an area that has had moderate to high pine shoot beetle populations over several growing seasons.
- Actions to increase pine shoot beetle populations at the site do not conflict with local or state compliance agreements to exclude PSB.
- There will be no cultural practices (sanitation) or pesticide applications at the site that negatively impact pine shoot beetle or natural enemy populations.
- PPQ and cooperators will have long-term access to the site for the next 3-5 years.
- The site is in or adjacent to a forested area (5-25 acres).
- The site is relatively near a commercial production area (timber, nursery or Christmas tree).

BARK BEETLE MEETING (*Dave Prokrym*). The PSB planning meeting scheduled for Feb. 14-15 in Indianapolis was postponed. Participants should check their E-mail messages from January 23 for details.

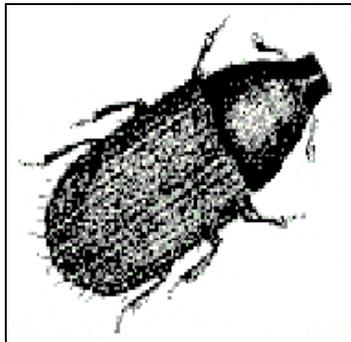
PSB INTEGRATED PEST MANAGEMENT (*Dave Prokrym*). Cooperators involved in the IPM demonstration effort will hold a technical planning meet on Feb. 14 in Wooster, OH. In 1996, the

participants will conduct PSB nursery and Christmas tree plantation IPM demonstration projects in **New York, Ohio and Pennsylvania**. Contact Al Barak for more information: phone (508) 563-9303, FAX (508) 564-4398.

FROM THE LABORATORY

PSB BIOLOGICAL CONTROL AGENTS IN CULTURE (*Greg Sautter*). Our data indicates that rearing the predator clerid, *Thanasimus formicarius*, is a long-term effort. For example, the developing larvae spend about 63 days as prepupae and pupae. The prepupal period lasts 1.5-2 months but can exceed 1 year. The average developmental time from egg hatch to adult is approximately 100 days in our cultures. Our observations agree with those reported elsewhere.

A new generation of predators has begun. Our 14 mated clerid pairs are producing eggs. To date, we have collected over 300 eggs. These eggs exhibit a 73% hatch rate. In fact, a few larvae are already prepupae.



We attribute our rearing success to the availability of quality hosts. The adults feed on PSB and *Ips pini* adults and the larvae are provisioned with wax moth larvae, a factitious host. Rearing studies utilizing different environmental conditions are underway to determine optimum larval rearing conditions. Basic biological data (e.g., food consumption, egg production and hatch rates) are collected to determine baseline information for future studies.

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We are attempting to develop an artificial diet that would allow us to rear bark beetle larvae in a gallery analog into which clerid larvae can be introduced. From conversations with bark beetle experts, we learned that bark beetles can be reared on an artificial diet. This approach would allow us to feed clerid larvae with their natural host. We feel that it is not practical to dissect bark beetle larvae from a log for rearing the predators. The dissection method is very time consuming and larval bark beetle mortality is very high (approaching 100% shortly after removal from the log).

PSB LABORATORY STUDY (*Bill Kauffman and Greg Sautter*). While rearing PSB to provide food for our clerid culture, we noted that PSB excavated galleries and oviposited in fresh logs *without an overwintering period* under bark. In this study, we exposed PSB-infested shoots, field-collected in October 1995, to logs held at different lengths of ambient cold temperatures. When PSB adults in shoots were moved directly to 25°C, with no cold exposure, they oviposited and larval progeny developed normally in logs. When PSB adults in shoots were kept at ambient cold temperatures, they remained in shoots until late November, then began an overwintering period under bark. When removed from ambient cold temperatures to 25°C, PSB adults immediately began ovipositing into fresh galleries. PSB adults in shoots exposed to prolonged extreme cold temperatures experienced high mortality. Therefore, by manipulating length of the cold period, we were able to circumvent an overwintering period (thus, a facultative overwintering). From Dec. 12, 1995 to Jan. 23, 1996, we collected 1,844 teneral PSB adults from these logs and fed them to our ravenous clerid adults.

PRE-RELEASE SURVEY (*Bill Kauffman & Deb Nelson*). The Niles evaluation staff processed 270 trap logs recovered from 18 sites. Over 45,000 PSB and 2,000 other bark beetle specimens were individually identified. We collected few native natural enemies that occurred during the PSB flight and developmental periods. Only 20 native clerids, *Thanasimus dubius*, were collected. This equates to one clerid per 2,350 bark beetles. We found members of other beneficial families: 83 histerid beetles, 28 staphylinid beetles, and 63 dolichopodid flies. We could not determine whether these natural enemies were attacking only PSB because other bark beetles were also present.

BARK BEETLE TAXONOMY (*Deb Nelson*). We found *Hylastes opacus* in Lorain and Geauga counties, Ohio during the 1995 pre-release survey. The identification of this exotic bark beetle was

verified by **Rick Hoebeke** of Cornell University and reported to **Bruce Smith**, State Plant Health Director of Ohio in early December. In addition to surveying for PSB natural enemies, the trained staff at Niles identified over 47,000 bark beetle adults to species (13 species total), with the intent of detecting exotic bark beetles.

THE NILES SPOTLIGHT

We would like to acknowledge the contributions of the biological aids at the Niles Center that maintain the clerid cultures:

Teresa Bartosch, Doug Chan, Sandy Sheely, and Vicki Walls.

Their work during the holiday period was an immense help and their fine effort has continued since then.



Our goal is to provide you with useful information in the most efficient manner possible. In our haste, we may omit some items that are important to you. Please bear with us as we attempt to provide the best service possible.

YOUR PSB PROJECT STAFF AT THE NILES LABORATORY INCLUDES:

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REMEMBER: *Your call is always welcomed!*