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S-2 BLACK-LIGHT TRAP FOR CAPTURING PECAN LEPIDOPTERA

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S-2 BLACK-LIGHT TRAP FOR CAPTURING PECAN LEPIDOPTERA

By John S. Smith, Jr.¹

ABSTRACT

An improved black-light insect trap for capturing pecan Lepidoptera was developed. The trap is small, lightweight, inexpensive, and relatively easy to build. Construction details and operation of the trap are discussed. **KEYWORDS:** insect control, insect-trap design, insect traps (electric), Lepidoptera (control on pecan), pecan (*Carya illinoensis*), S-2 black-light trap.

INTRODUCTION

Black-light traps have been used for surveying nocturnal insects and as a possible control for insects (4).² Tedders et al. (8) used black-light traps to suppress the hickory shuckworm, *Laspeyresia caryana* (Fitch), in an 8-acre pecan orchard to a degree equal to the control obtained by conventional applications of insecticides. Fifteen-watt omnidirectional survey-type black-light traps were mounted on tripods as described by Harding et al. (3) for the first 2 years. In the third year, these traps were modified by removing the baffles. Smith et al. (6) used 6-watt traps of the type described by Tedders and Edwards (7) to reduce significantly the pecan shuck infestation by hickory shuckworms. After 3 years of operating the 6-watt traps in an 8-acre orchard, infestation of pecans by the hickory shuckworm was reduced to an amount considerably below the level of economic control (5). The pecan bud moth, *Gretchena bolliana* (Slingerland); the pecan nut casebearer, *Acrobasis nuxvorella* (Neunzig); the walnut caterpillar, *Datana integerrima* (Grote and Robinson); and the fall webworm,

(Continued on page 4.)

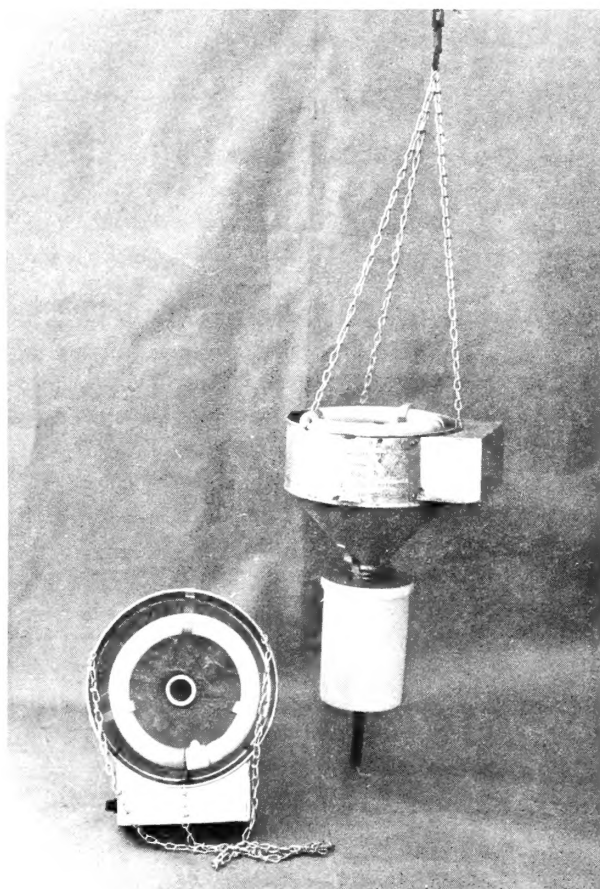
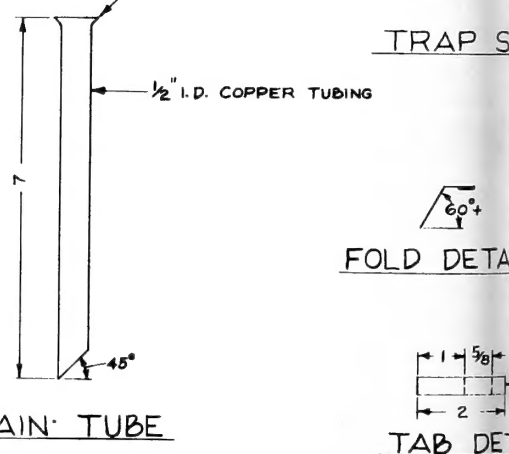
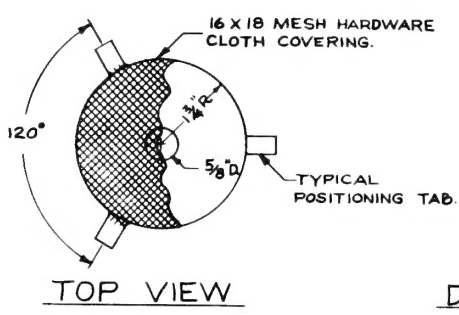
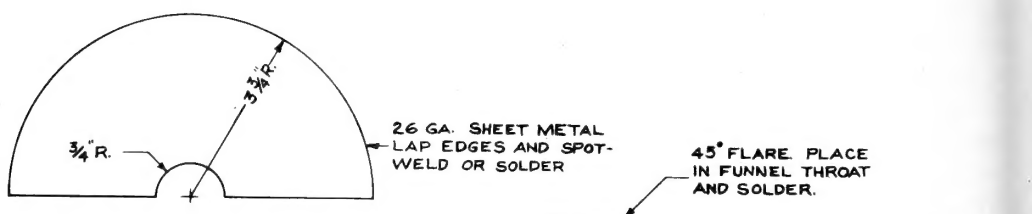
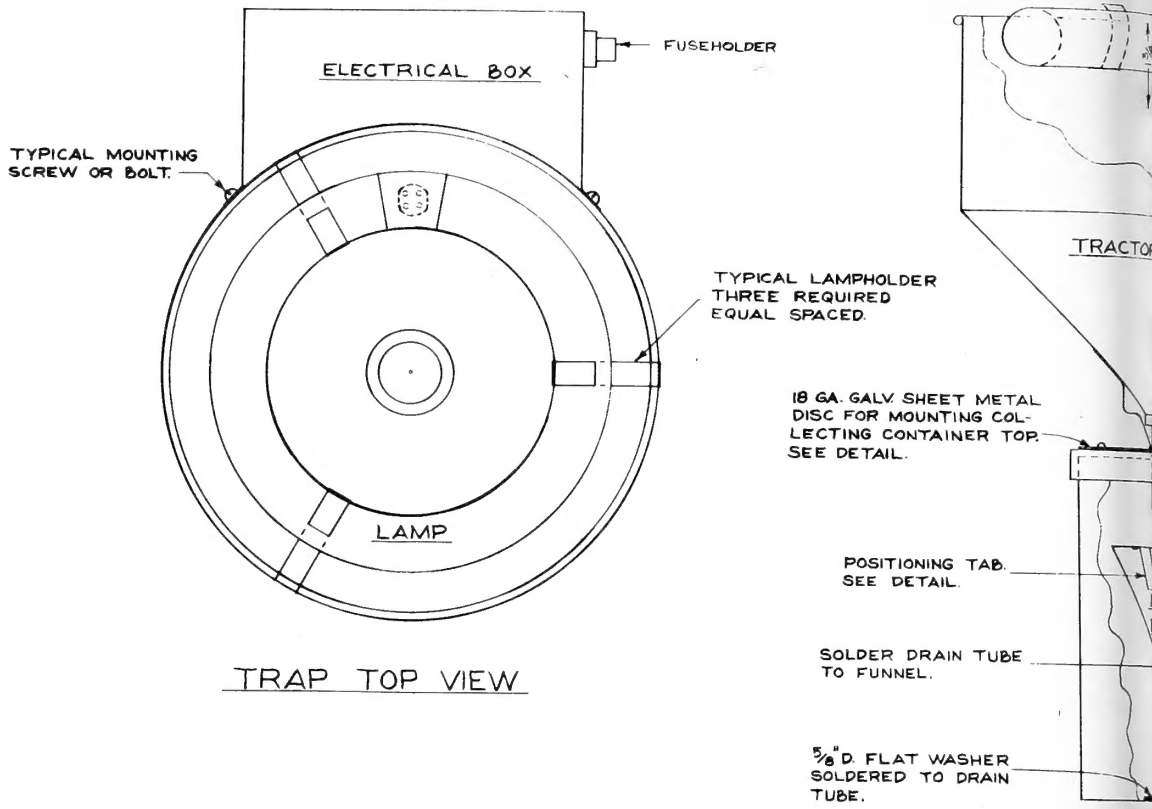


FIGURE 1.—The S-2 black-light trap.

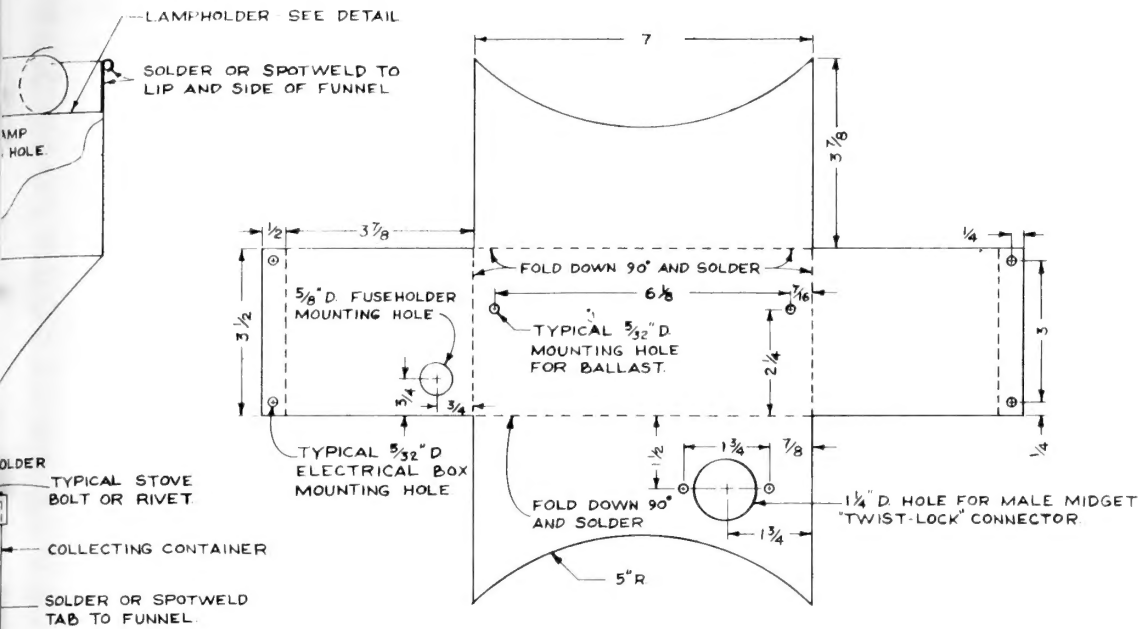
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² Italic numbers in parentheses refer to items in "Literature Cited" at the end of this publication.

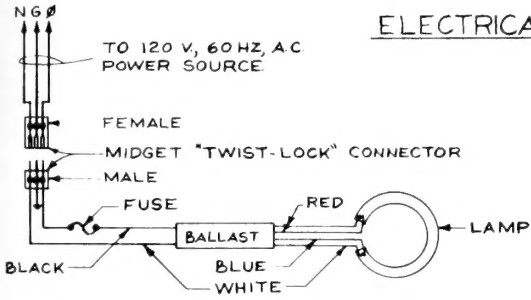


RAIN DRAIN DETAIL

FIGURE 2.—Plan

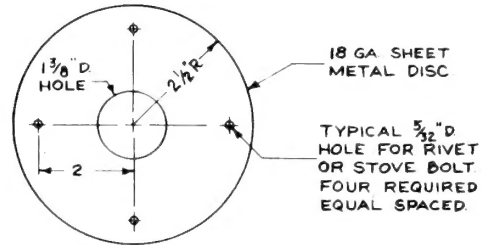


ELECTRICAL BOX LAYOUT



SCHEMATIC WIRING DIAGRAM

NO SCALE



COLLECTING CONTAINER TOP MOUNTING DISC DETAIL

SCALE: 1" = 1"



FOLD DETAIL



LAMPHOLDER DETAIL

black-light trap.

Hyphantria cunea (Drury), were also suppressed to the degree that no detectable damage was observed.

The 6-watt trap developed by Tedders and Edwards was modified by Smith and Edwards by replacing the 6-watt F6T5/BL lamp with a 22-watt FC8T9/BL lamp with required accessories. The modified trap, designated as "S-2," caught up to five times as many hickory shuckworms during high population levels as did the 6-watt trap (unpublished data of author, 1971). The S-2 trap described herein has been used successfully in an integrated pecan pest-management pilot test to control Lepidoptera attacking pecan (1, 2).

CONSTRUCTION AND DISCUSSION

The S-2 trap is shown in figure 1. A galvanized sheet-metal commercial tractor-type fuel funnel with a 10-inch-diameter mouth and a 1½-inch-diameter throat is the basic structure of the trap. The filter screen is removed from the funnel throat, and three sheet-metal tabs equally spaced around the funnel mouth (figs. 1 and 2) are soldered or spot-welded to the funnel to support the circline lamp. The tabs are also needed for proper lamp starting. A ¾-inch hole is punched 1¾ inches below the funnel rim for passage of the lamp socket with connecting wiring from the ballast in the electrical box to the lamp in the funnel. This hole is fitted with a ⅝-inch-inside-diameter rubber grommet to protect the wiring from the sharp sheet metal. An insect-collecting container (a 72-ounce twist-top plastic food jar) is fitted to the neck of the funnel. A 5-inch-diameter disk of 18-gage sheet metal with four equally spaced ⅝-inch-diameter holes 2 inches from the center and a 1⅜-inch center hole is slipped on the funnel up to the filler-neck locking device and soldered. The jar top, with a center hole wide enough to allow the funnel neck through, is secured to the sheet-metal disk with rivets or small stove bolts (fig. 2).

A drain is installed in the insect-collecting container to prevent rain from entering. The rain drain consists of a piece of ½-inch-inside-diameter copper tubing 6 to 8 inches long with one end flared and the other cut at a 45° angle, attached to a 60° funnel with a 3½-inch-diameter mouth and a ⅝-inch-diameter throat.

The flared end of the drain tube is fitted and soldered in the ⅝-inch throat. Three equally spaced sheet-metal tabs are attached to the rim of the funnel for proper positioning of the drain. The mouth of the drain funnel is covered with 16-mesh hardware cloth to prevent the captured insects from escaping through the tube. A flat washer with a ⅝-inch hole is soldered to the drain tube high enough to provide ¾ to 1 inch of clearance between the bottom of the trap funnel neck and the top of the drain funnel when the drain is in place. The drain tube is passed through a ⅝-inch hole drilled in the bottom of the insect-collecting container. The 45°-angle cut of the drain tube makes for easy insertion into the ⅝-inch hole in the insect-collecting container (fig. 2).

It is usually desirable to kill or inactivate the insects as soon as possible after capture, especially when using the trap for survey purposes. A 3- by 3-inch piece of Vapona insecticide strip suspended from a wire attached to the jar top will kill the insects within a short time. The Vapona should be attached to a wire long enough to allow it to extend below the mouth of the rain drain, between the rain drain and the side of the insect-collecting container.

The ballast and electrical components, with the exception of the black-light lamp, are housed in a 7- by 2½- by 3½-inch sheet-metal enclosure constructed from 26-gage galvanized sheet metal. The enclosure is built to conform to the shape of the side of the tractor funnel, with the funnel serving as the back of the enclosure. The housing is attached to the trap with four sheet-metal screws or small stove bolts. Power is supplied to the S-2 trap by attaching the power-supply cord to a male midget twistlock connector mounted on the bottom of the enclosure.

The power-supply cord should be of No. 18-3 SJO or SJT power cord resistant to sunlight, and it should be long enough to permit the trap to be raised or lowered to the desired height without placing tension on it. At one end the power-supply cord has a female midget twistlock connector that couples with the male connector on the S-2 trap, and at the other end it has a three-wire grounding, polarized connector (fig. 2).

The S-2 trap is held up by three pieces of No. 3 coil chain spaced equally around the trap rim. Two of the chains should be approximately

TABLE 1.—*Components of the S-2 black-light trap*

[1 of each item]

Component	Description
Tractor fuel funnel	10-in mouth with 4-in-high side and 1¼-in neck constructed from sheet metal and then hot-dip galvanized. General Metalware stock No. T. F. 123 or equal.
Ballast	120-V, 60-Hz rapid-start ballast for 22-W circline lamp complete with lamp socket. Universal catalog No. 547-RS-WS or equal.
Lamp	120-V, 60-Hz, 22-W black-light rapid-start circline fluorescent lamp. Sylvania No. FC8T9/BL/RS or equal.
Fuse holder	15-A, 250-V panel-mounted fuse holder with screw cap for type AGC fuses. Bussman type HLF or equal.
Fuse	1-A, 250-V fuse. Bussman type AGC or equal.
Trap power connector	15-A, 120-V male midget twist-lock connector. Bryant catalog No. 7486-MB or equal.
Power-cord connector	15-A, 120-V female midget twist-lock connector to mate with trap power connector. Bryant catalog No. 7484-NC or equal.
Power cord and cap	25-ft sunlight-resistant No. 18-3 SJO or SJT with a three-wire grounding, polarized cap suitable for connecting to power source. Locking type, Bryant catalog No. 4720 or equal. Straight-blade type, Bryant catalog No. 5266 or equal.
Collecting container	72-oz twist-top plastic food jar. Republic Molding No. 116 or equal.

18 inches long. The other, one link shorter, is attached at the midpoint of the location for the electrical enclosure, because the weight of the ballast contributes a high percentage of the total trap weight. The trap will not hang level if the shorter chain is not attached to the trap rim near the ballast. S-hooks are convenient for attaching the chains to the trap and also for connecting the loose ends to a rope used to suspend the trap from the tree.

Total shuckworm captures have been greatest at a height of about 30 feet in mature trees with heights of 60 feet or more (unpublished data of author, 1971). Therefore, the traps should be suspended at a height of 25 to 30 feet in mature trees, and at midheight for shorter trees. A ¼-inch-diameter nylon rope passed over a small pulley attached to a limb is suggested for positioning the trap in the tree canopy.

A list of the components of the S-2 trap is given in table 1.

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