

species caught per trap-night and in economy of manpower expended to tend the traps. The AMSS trap is also better than an animal-baited trap in respect to total number of mosquito species caught per trap night and in economy of manpower.

The once-a-day tending system which will retain live specimens in the trap throughout the day has proven to be a useful and effective system for efficient utilization of manpower.

## THE U.S. ARMY PORTABLE INSECT SURVEY SET<sup>1</sup>

JAMES T. KARDATZKE, DONALD P. DRIGGERS,<sup>2</sup> RICHARD J. O'CONNOR,  
JESSE L. STUP, BERNARD A. SCHIEFER

US Army Medical Bioengineering Research and Development Laboratory, Fort Detrick, Frederick, MD 21701

**ABSTRACT.** A new portable insect survey set has been developed at the U.S. Army Medical Bioengineering Research and Development Laboratory, Fort Detrick, Frederick, MD 21701. The basic component is the Army

Miniature Solid State Mosquito Light Trap (AMSS trap). The set is equipped with a variety of both AC and DC power sources and all ancillary items needed for continuous operation.

A new portable insect survey set has been developed and evaluated at the U.S. Army Medical Bioengineering Research and Development Laboratory, Fort Detrick, Frederick, Maryland. The trap used in this set is the Army Miniature Solid State Mosquito Light Trap (AMSS trap) (Driggers et al. 1980). Unlike the current set which it will replace, this new self-contained insect survey set utilizes a variety of both AC and DC power sources.

The old miniature trap and trap set had many deficiencies including mechanical defects and a requirement for tending twice a day. The old trap set consisted of a 3.2 cubic ft. medical chest which contained 4 miniature traps, 5 wet-cell, lead-acid batteries, a single bat-

tery charger, 8 catch-nets and 4 kill-jars. The wet cell batteries had the typical problems associated with handling battery acid and maintenance during the winter. To solve the problem of the wet-cell batteries, a CDC trap using 4 D-cell batteries was adopted. This trap still had the mechanical and tending problems of the old trap. Additionally, a large electrical load was placed on the D-cell batteries with the potential for the motor to stop prior to tending in the morning. Also, the cost of replacing 4 D-cell batteries daily was greater than the cost of the wet-cell battery. These deficiencies led to the development of the AMSS trap and insect survey set (Fig. 1) which have the unique features of once-a-day tending and the capability of being effectively operated by any 6-volt power source.

The basic component of the new insect survey set is the AMSS trap. This trap and its advantages have been described by Driggers et al. (1980). The new trap set will have 6 AMSS traps, while the old set had only 4 traps.

The insect survey set will be provided with 3 power sources: gelled electrolyte batteries, AC/DC converters, and D-cell battery holders.

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<sup>2</sup> Preventive Medicine Activity, USAMED-DAC, Fort Ord, CA 93941.



Figure 1. The Army portable insect survey set. (1) D-cell battery holder, (2) AMSS trap, (3) AC/DC converter, (4) Killjar assembly, (5) Charging spider, (6) Battery charger, (7) Catch-nets, (8) Chest, (9) Trap lids under nets. Gel-cell batteries not pictured.

The primary power source is a self contained Globe® gel-cell 6-volt, 6 ampere-hour rechargeable battery which has a high energy to weight ratio. The gel-cell battery eliminates handling battery acid and other problems associated with the use of wet-cell batteries. The discharge characteristics of the gel-cell battery give a relatively constant operating voltage over a sustained period of time. This is important since a drop in voltage would result in a significant decrease in candlepower of the lamp with a corresponding decrease in attractiveness to mosquitoes. A total of 12 batteries will be included with each set.

The secondary power source is an AC converter which allows the use of AC current converted into a usable 6-volt source. Although the AMSS trap is not intended

to replace the New Jersey light trap, the converter adds another dimension to the use of the AMSS trap. A total of 6 converters will be included in each set.

The tertiary power source for the survey set is a system of 4 D-cell batteries in a waterproof container. A total of 6 containers is in the set only as a backup source when the gel-cell batteries are not available. Effectiveness of the AMSS trap is expected to suffer when the D-cell batteries are used, because significant drops in lamp voltage will occur within 2 hr when using standard D-cell batteries. Any other 6-volt source can be used if other alternative sources are required.

The survey set contains a single modified automobile battery charger and charging spider, which can recharge up to 6 gel-cell batteries at one time. Since

the set is provided with 12 gel-cell batteries, the miniature trap can be operated continuously on 1 set of 6 batteries while the other 6 are being recharged. Operating instructions will call for the exchange of batteries daily.

The insect survey set is capable of collecting live specimens. The live catch-nets are standard with 1 modification, a durable elastic band is sewn into the netting above the tie-string. This allows the net to be tied shut prior to removal from the trap, and prevents accidental dislodgement of the net during operation.

A 2nd collection method is the kill-jar. These are plastic mason jars with small metal funnels. The upper ring allows for easy mounting. The mounting is held in place by lightly screwing the side screws above the bottom ring of the trap.

With the exception of the 12 gel-cell batteries, all components are packed into a 3.2 cubic ft. chest (Fig. 1), which when packed, weighs 55 pounds. Due to the high weight density of the gel-cell batteries, these batteries cannot be packed

with the other components. Drop tests conducted at this laboratory demonstrated that when the gel-cell batteries were packed with all other components, they would cause breakage of the AMSS trap body if the chest were dropped. To prevent this, the 12 gel-cell batteries were packed into a separate smaller chest.

The new Army portable insect survey set will be a useful tool for surveillance of adult mosquitoes in the field. The versatility of the AMSS trap to accept any 6 volt DC source will allow its use in a wide variety of conditions. Due to the unique characteristics of the AMSS trap and the components of the set, one individual will be able to operate an extensive number of these traps, since tending will be required only once a day.

#### *Reference*

- Driggers, D. P., R. J. O'Connor, J. T. Kardatzke, J. L. Stup and B. A. Schiefer. 1980. The Army Miniature Solid State Mosquito Light Trap. *Mosquito News*. 40:172-178.

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