SCIENTIFIC NOTES

NOTES ON THE USE OF CO_2 BAITED CDC MINIATURE LIGHT TRAPS FOR MOSQUITO SURVEILLANCE IN THAILAND [1]

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The use of CDC Miniature Light Traps, as well as their employment with CO_2 as a bait, has been reported by Bellamy and Reeves (1952), Sudia and Chamberlain (1962), and Newhouse *et al.* (1966). Mosquito surveys conducted throughout Thailand during 1967 and 1968 indicated that the CDC Miniature Light Traps were unsatisfactory for field surveys because they consistently produced catches too small for evaluation. In an effort to improve the efficiency of the miniature traps, the relative attractiveness to mosquitoes of the CDC traps baited with various conditions of light and CO_2 was tested.

Nine traps were mounted on metal poles 1 meter above the ground and placed 16 meters apart in a randomized block design consisting of 3 rows of 3 traps each. Traps were baited with (1) light alone, which was used as the control condition, (2) CO_2 alone, and (3) CO_2 plus light. Those baited with CO_2 were set up by wrapping a large piece of dry ice in heavy brown paper and suspending it near the entrance to the trap. The motors on all traps were operated. Light bulbs were removed from the traps baited with CO_2 alone. The traps were operated from 1830 to 0600 hours on the night of 5–6 July 1968 in an open field 4 kilometers southeast of the city of Korat, Thailand. Mean temperature and relative humidity during the test were 25.4° C. and 87.6 percent, respectively.

Two traps failed to operate during the test period. As a result, there were 3 replicates of traps baited solely with CO_2, but only 2 replicates each of traps baited with light alone and CO_2 plus light. Mosquitoes were killed using pyrethrin aerosol, removed from the collecting bags, and identified. A total of 640 female mosquitoes, representing 5 genera and 18 species, was collected. The number of male mosquitoes was insufficient to include in the results. Significant differences were observed in the attractiveness to females of the various bait conditions tested (Table 1). Compared to the control traps, the total mean catch in traps baited solely with CO_2 was increased 30 fold, and the traps baited with CO_2 plus light yielded better than a 100-fold increase.

TABLE 1.—Female mosquitoes captured in CDC Miniature Light Traps baited with various conditions of CO_2 and light. Korat, Thailand. 5–6 July 1968.

Species	Mean Number of Females in Traps Baited with		
	Light [a]	CO_2 [b]	CO_2+ Light [a]
Anopheles nigerrimus	0	0	0.5
Anopheles ramsayi	0	0.3	1.5
Anopheles subpictus	0	8.7	6.0
Anopheles vagus	0	1.3	0
Mansonia annulifera	0	2.0	15.0
Mansonia indiana	0	1.7	5.0
Mansonia uniformis	1.5	17.3	96.0
Coquillettida crassipes	0	0	0.5
Aedes lineatopennis	0	4.0	19.5
Aedes mediolineatus	0	2.3	11.5
Aedes taeniorhynchoides	0	1.3	6.0
Culex annulus	0	1.7	4.5
Culex fuscanus	0.5	0	0
Culex fuscocephalus	0	1.3	16.5
Culex gelidus	0	3.3	26.0
Culex quinquefasciatus	0	10.3	0
Culex tritaeniorhynchus	0	5.0	13.5
Culex whitmorei	0	0.3	4.5
Total Mean [c]	2.0	60.8	226.5

[a] 2 replicates.
[b] 3 replicates.
[c] Least Significant Difference (.05)=41.1.

These results indicate that CDC Miniature Light Traps baited with CO_2 plus light, or CO_2 alone, represent a useful tool for mosquito surveillance in Thailand because (1) the catch is increased significantly, and (2) the traps maintain their original versatility, since the only required electrical source is a standard dry cell battery. In addition, traps baited with CO_2 alone are advantageous for studying mosquito populations in areas where existing conditions preclude the use of lights after dark. In summary, during mosquito surveillance operations in Thailand, total collections of female mosquitoes from CDC Miniature

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Light Traps baited with CO_2 alone, and CO_2 plus light, were 30- and 100-fold higher, respectively, than from CDC Miniature Light Traps baited with light alone.

Literature Cited

BELLAMY, R. E., and REEVES, W. C. 1952. A portable mosquito bait trap. Mosq. News 12(4): 256–258.

NEWHOUSE, V. F., CHAMBERLAIN, R. W., JOHNSTON, J. G., and SUDIA, W. D. 1966. Use of dry ice to increase mosquito catches of the CDC miniature light trap. Mosq. News 26(1): 30–35.

SUDIA, W. D., and CHAMBERLAIN, R. W. 1962. Battery operated light trap, an improved model. Mosq. News 22(2):126–129.

OCCURRENCE OF *Aedes dorsalis* (MEIGEN), *A. dupreei* (COQUILLETT), AND *A. punctor* IN INDIANA[1]

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A. dorsalis was collected in Steuben County, in the northeastern corner of Indiana, in a tamarack bog located approximately four miles west of Fremont. Twelve specimens of *A. dorsalis* were in the huge collection, numbering over 9000, in a CDC light trap baited with dry ice. The trap was set in the late evening on June 27, 1969, and recovered the following morning. The remainder of the collection was predominantly *A. vexans* and *Mansonia perturbans.*

No larvae of *A. dorsalis* were collected in a survey of this bog on April 24, 1969. Larvae of other mosquitoes present included *A. abserratus, A. canadensis, A. excrucians,* and *Culiseta melanura.*

Long migratory flights of *A. dorsalis* have been reported (Rees and Nielson, 1947). Migration into the bog might have occurred from other parts of the county, or even from neighboring states. The fact that high winds prevailed and tornado threats existed in northern Indiana on June 27 increased the likelihood of this phenomenon. Further studies are planned at this site.

Two specimens of *A. punctor* were taken in a biting collection on the evening of June 11, 1968. This collection also was made in Steuben County, approximately two miles southeast of Fremont. Other species in the collection were *A. abserratus, A. sticticus* and *A. cinereus.*

A. dupreei occurred in a wet woods in Spencer County, in southwestern Indiana. This woods is located approximately one mile northwest of Grandview. A CDC light trap, baited with dry ice, was set at this site during the evening of July 17, 1969, and recovered the next morning. The entire collection contained 130 specimens, representing 15 species. There were five *A. dupreei* in the collection.

The three species reported in this paper are believed to be rare in this state. This brings to 50 the number of species of mosquitoes reported from Indiana.

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References

REES, D. M., and L. T. NIELSEN. 1947. On the biology and control of *Aedes dorsalis* (Meigen) in Utah. N. J. Mosq. Exterm. Assoc. Proc., 34:160–165.

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FURTHER RECORDS OF THE MOSQUITO, *Psorophora ciliata* (FABR.) IN THE VICINITY OF LONDON, ONTARIO

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In a previous report (Judd, 1962) an account was given of the occurrence of a single female *Psorophora ciliata* at London, Ontario in 1962, this being the first record of this species from that locality. Six years later, in 1968, four more females were found in widely separated parts of London and its vicinity.

On July 22 an engorged female was found dead in the water dish of a dog on the property of a breeder of husky dogs on Dingman Creek in Delaware Township, about 5 miles southwest of London. On August 19 one was found in the basement of the house at 432 Hibiscus Avenue in the west end of London and was aggressive in following the householder about the basement. On September 21 two were found on the verandah of the house at 438 Briarhill Avenue in the east end of London at about 10 p.m. The householder reported that one of the mosquitoes bit his left hand and that the other was captured while it was circling over his left leg. The four mosquitoes were identified with keys in Carpenter and LaCasse (1955) and Steward and McWade (1961) and are deposited in the collection of the Department of Zoology, University of Western Ontario.

The presence of these four mosquitoes in 1968 indicates that this species was more common than