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DETERIORATION OF THATCH ROOFS BY THE LARVA OF A MOTH
AFTER HOUSE-SPRAYING IN A MALARIA ERADICATION PROJECT
IN NORTH BORNEO

by

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During the Tenth Borneo Malaria Conference, the Sarawak representative referred to a complaint that spraying by DDT caused thatch ("attap") roofs to rot, and the native chief, O. K. K. Sodomon, North Borneo, raised the same problem that the DDT spraying spoiled the thatch roofs of many local houses in his area.¹

After careful examination, many old thatch strips collected from the rotten roofs were found harbouring a brownish caterpillar, a larva of the pyralid moth, Herculia nigrivitta Walker belonging to the family Pyralidae.² The larva has the habit of spinning a silken burrow beneath and between two pieces of thatch to which it retreats when not feeding. Usually each thatch strip is occupied by a single larva. As the infested thatch deteriorates with many feeding injuries, it has to be replaced from time to time.

Density surveys of thatch-eating larva in unsprayed and insecticide (DDT and dieldrin) sprayed areas were conducted with the following results:

¹ DDT in the form of a water-dispersible powder is used over most of North Borneo; dieldrin is used only in Papar and Jesselton district and in Keningau South (Editor's remark).

² The larvae and moths were kindly identified by Mr P. E. S. Whalley of the British Museum.

Areas surveyed	Number of live thatch-eating larvae per square foot of infested roof
Ranau, unsprayed area	4.2
Keningau North, DDT-sprayed area	6.6
Keningau South, dieldrin-sprayed area	0.2 (with 4.8 old cocoons)

The above findings revealed that rotten thatch roofs also occurred in most of the local houses in Ranau, an unsprayed area. It is obvious that the deterioration of thatch roofs was not associated with DDT-spraying alone. However, the density of thatch-eating larvae in an unsprayed area is lower than that of a DDT-sprayed area. In the dieldrin-sprayed area, 0.2 live larvae and 4.8 old cocoons per square foot of infested roof were found. The live larvae were those which survived in the presence of dieldrin, while the old cocoons represented the number of larvae existing before spraying. The density of thatch-eating larvae, therefore, had been reduced from 4.8 to 0.2 larvae per square foot of the infested roof after dieldrin-spraying.¹

A test on susceptibility of thatch-eating larvae to DDT indicated that the larvae have the ability to distinguish the presence of DDT from the unsprayed thatch and to refuse to feed on DDT-sprayed thatch, although they have been starved for 24 hours. Deliberate avoidance of DDT, therefore, is a major factor in the survival potential of the thatch-eating larvae in the DDT-sprayed area.

Another test on susceptibility of thatch-eating larvae to dieldrin indicated that the larvae are very susceptible to dieldrin, with a mortality rate up to 92%. These findings explain why more damage was caused by the larvae in the DDT area than in the dieldrin area. The difference between DDT and dieldrin in relation to the density of thatch-eating larvae is probably due to the different toxicity and irritability of the two insecticides.

¹ In Labuan - a small area where dieldrin was sprayed - no thatch-eating moth has ever been found (Editor's remark).

Fifty healthy and full-grown thatch-eating larvae collected from the unsprayed area were used for a rearing test. After a few days, the larvae, staying at the end of their burrows, with heads pointing forward began to spin their thin, transparent and oblong silk cocoons. This done, the larvae lived perfectly motionless for one day and then transformed into black pupae, together with their larval exuviae inside their cocoons. The pupal stage lasted from six to eight days. After this period, the pupa became active showing wriggle movements. In a short time the exposed pupal skin became dry and split, and the moth escaped. The newly emerged moth climbed up on the thatch strip and shook out its wings until they were fully expanded and hardened.

During rearing, certain pupae remained unchanged and motionless for more than 10 days. Finally, a very active and small hymenopterous parasite, a chalcid-fly, Antrocephalus sp.¹ appeared. Altogether eight chalcid-flies were recorded. The parasite rate of chalcid-fly in the sample was therefore 16%.

A preliminary test was conducted by enclosing a chalcid-fly in a test-tube with a piece of DDT-sprayed thatch strip. It was found that all the chalcid-flies were knocked down after exposure for one hour.

Since the parasitic chalcid is very susceptible to DDT, the survival of this natural enemy in the DDT-sprayed area becomes low and the parasites failed to control the thatch-eating larvae. Probably this is why the density of thatch-eating larvae is higher in DDT-sprayed areas compared with unsprayed areas.

¹ The hymenopterous parasites belonging to the Chalcidae family were kindly identified by Mr E. Adams of the British Museum.

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