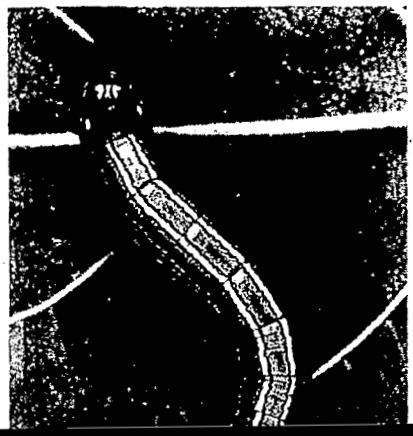

Fig. 2. Last-instar larvae of *Epicerura pergrisea* (4,5 cm length).

MATERIALS AND METHODS

Chemical application in the field

The experiments were conducted in December 1986 in the *Terminalia* plantation (5000 ha) in Mopri. An estimated 1500 ha were defoliated by third- and fourth-instar larvae of *E. pergrisea*. The chemicals were tested in a 3-year-old plantation (plot No. 22). Trees of this plot are less than 5 m high. Trees to be treated were marked and plastic sheets were placed under each. Decamethrin (Decis), a pyrethrenoid insecticide, was tested at concentrations of 2.4, 4.4, 7.2, 9.6 and 12 g a.i. ha^{-1}. Evisect S (50% hydrogenoxalat of thiocyclam) was applied at concentrations of 50, 100, 300 and 400 g a.i. ha^{-1}. Four trees were sprayed with each dosage of the chemicals and two trees served as controls.

A 10-l atomiser with a discharge of 2.9 l min^{-1}. and a range of 4.5 m height was used for insecticide application.

Larval sampling to determine effectiveness was done for each treated tree at 5 h, 12 h, and 24 h after treatment.

Pathogenicity tests of RNA virus

Dead infected larvae of *E. pergrisea* were collected from *Terminalia* at Mopri in December 1985 and were stored at −30°C. Extracts of insect for infec-

tivity assays were prepared by homogenizing the infected larvae in 0.05*M* Tris Buffer (T.B.), pH 7.8, containing 0.5% sodium dodecyl sulfate. The extract was squeezed through cheesecloth and the emulsion centrifuged at 8000 g for 10 min. The supernatant fluid was kept and the pellet re-extracted twice by sonication in T.B. The resulting supernatants were mixed and the virus was pelleted by centrifuging at 145 000 g for 1 h 30 min at 4°C. The pellet was allowed to resuspend overnight in small volumes of T.B. in the ratio of 1 ml to 5 g infected larvae. This suspension, which contained a small isometric

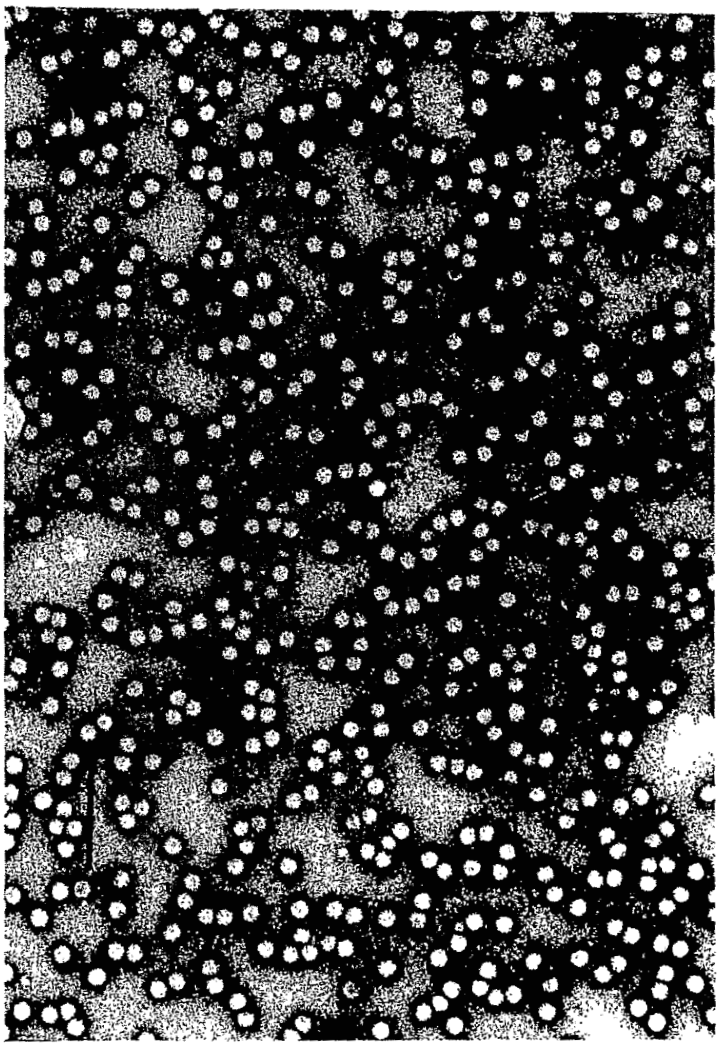

Fig. 3. Electron micrograph of the negatively stained isometric RNA virus particles in *Epicerura pergrisea* larvae. Scale bar = 300 nm.

RNA virus of 30 nm in diameter (Fig. 3; Fediere et al., 1987) was used for pathogenicity tests in laboratory.

Caterpillars of *E. pergrisea* were collected in the field at Mopri in December 1987 and reared in the laboratory. They were divided into groups of 50 individuals, placed into rearing cages, and fed with leaf buds of *Terminalia*.

A per-os infection of 1250 larvae was done by spreading the viral suspension onto *Terminalia* leaflets.

RESULTS AND DISCUSSION

Chemical field trials

Decis and Evisect S were applied at the same time on third- and fourth-instar larvae of *E. pergrisea* in the field. Percent mortality recorded 5, 12 and 24 h after treatment was calculated as the ratio of the number of dead cater-

TABLE 1

Mortality of third- and fourth-instar larvae of *Epicerura pergrisea* on trees sprayed with Decamethrin in Côte d'Ivoire in 1986

Dosage (g a.i. ha^{-1})	Number of larvae	Mortality[a] (%) @ x h after treatment:		
		5	12	24
0.0	1922	0	2	7
2.4	2166	37	46	57
4.8	3095	57	66	86
7.2	3650	64	72	93
9.6	2817	71	88	99
12.0	3234	95	98	100

[a]Adjusted by Abbot's formula.

TABLE 2

Mortality of third- and fourth-instar larvae of *Epicerura pergrisea* on trees sprayed with hydrogenoxalat of thiocyclam in Côte d'Ivoire in 1986

Dosage (g a.i. ha^{-1})	Number of larvae tested	Mortality[a] (%) @ x h after treatment:		
		5	12	24
0	1922	0	2	7
50	2778	25	36	45
100	1865	54	65	78
200	3435	61	73	90
300	3014	73	84	94
400	3538	76	88	97

[a]Adjusted by Abbot's formula.

TABLE 3

Effectiveness of isometric RNA virus in the laboratory on *Epicerura pergrisea*

Days after infection	Percent mortality	
	Infected larvae	Control larvae
3	15	9
4	25	12
5	42	15
6	52	19
7	60	22
8	68	27
9	84	32
10	88	36
11	90	37
12	96	38
13	98	40
14	100	41

pillars to the total number of caterpillars found on the treated tree (Tables 1, 2). The insecticide Decis caused insect mortality within 5, 12 and 24 h after treatment. At the concentrations of 4.8 and 9.6 g a.i. ha^{-1}, the larval mortalities after 24 h were 86% and 99% respectively. These results agree with those obtained by Philippe (1986), who reported that total mortality of caterpillars of *Turnaca rufisquamata* (Notodontidae) on *Alaeis guinensis* was reached at a concentration of 8–10 g a.i. of decamethrin ha^{-1}. Fourcaud (1986) reported 95.7% larval mortality of *Lymantria dispar* at a concentration of 5 g a.i. of decamethrin.

Good efficacy was achieved with Evisect S at a concentration of 100 g a.i. ha^{-1}, with 78% larval mortality of *E. pergrisea* 24 h after treatment. A total of 99% mortality was recorded when hydrogenoxalat of thiocyclam was used at a concentration of 400 g a.i. ha^{-1}. Similar results were obtained by Philippe (1986), who reported total control of *T. rufisquamata* larvae when Evisect S was applied at a rate of 150–200 g a.i. ha^{-1}.

Pathogenicity tests of RNA virus

This test was performed with 1250 infected larvae of *E. pergrisea* and 1347 larvae as controls. In the laboratory, the isometric RNA virus caused high larval mortality (Table 3). One week after infection, larval mortality reached 60%, and 100% within two weeks.

Larval mortality recorded in the controls was caused by infection of these larvae, by virus or other disease, before they were collected.

CONCLUSION

The results of the field trials reported here indicate that chemical control using Decis and Evisect S can protect *Terminalia* plantations from *E. pergrisea* attack. However, these chemicals have broad-spectrum insecticidal activity, and lead to environmental contamination and ecological disturbance. Therefore, it seems better to develop a viral biological insecticide which is selective and not a pollutant, and may be effective for more than one year.

The tests of pathogenicity of the viral suspension of *E. pergrisea* in the laboratory indicate acceptable pathogenicity. It is desirable to use the virus in an integrated control program, but it is still necessary to establish the LD_{50} for the host insect, and to determine the host range of the virus. Small-scale field trials with the virus seem to be the appropriate next step.

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