

**THE OVICIDAL EFFECT OF  
DIFLUBENZURON ON HEMIPTERAN BUGS,  
DYSDERCUS CINGULATUS AND  
CHRYSOCORIS PURPUREUS.**

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THE inhibitors of chitin synthesis constitute the new class of insecticides; these interfere with chitin deposition in the cuticle of insects and cause difficulty during moulting process<sup>1, 2</sup>. Very limited information is available on the ovicidal effect of chitin synthesis inhibitor, diflubenzuron [1-(4-chlorophenyl)-3-(2,6-difluorobenzoyl) urea] on insect pests<sup>3-6</sup>. The aim of the present investigation is to assess the effect of topical application of diflubenzuron, both on eggs and gravid females on the suppression of egg hatching in hemipteran bugs, *Dysdercus cingulatus* and *Chrysocoris purpureus*.

Diflubenzuron was dissolved in acetone, and spread in petridishes as a thin uniform film. Forty eggs of various ages of *D. cingulatus* and *C. purpureus* were kept in contact with the treated surface of the petridishes, throughout their incubation periods. The nymphs, emerged out of the treated eggs were counted and compared with those of controls (table 1). Different doses of diflubenzuron were topically applied on the ventral side of the abdomen of gravid females of the bugs immediately after copulation. The number of eggs laid by them and the nymphs hatched out of these eggs are given in table 2.

LC<sub>100</sub> value for *C. purpureus* is ten times greater (1000 ppm) than that for *D. cingulatus* (100 ppm), indicating that *D. cingulatus* is more susceptible to the action of this insecticide. When diflubenzuron is applied to eggs, the percentage of egg hatching is gradually reduced upto 48 hr and it is not affected at/after 72 hr, suggesting that the eggs are more susceptible during early ages to the action of diflubenzuron and as age progressed they develop resist-

**Table 1** Effect of topical application of diflubenzuron on the hatching of the eggs.

Age of the eggs (hr)	Percentage of egg hatching													
	<i>Dysdercus cingulatus</i>							<i>Chrysocoris purpureus</i>						
	Concentration of diflubenzuron in ppm													
	100	50	25	10	5	2	1	1000	750	500	250	100	50	25
0-2	No hatching	24.7	39.7	59.2	71.0	89.4	97.9	No hatching	11.5	22.5	49.8	65.9	70.0	61.0
24-26	30.3	42.7	61.3	60.3	71.7	80.5	100.0	No hatching	20.0	40.0	59.2	80.0	84.0	100.0
46-48	69.3	71.4	80.1	100.0	100.0	100.0	100.0	67.8	81.4	81.4	100.0	100.0	100.0	100.0
70-74	100.0	100.0	100.0	100.0	100.0	100.0	100.0							

**Table 2** Effect of topical application of diflubenzuron on gravid females on fecundity and egg hatching.

	Average number of eggs laid/female								Percentage of egg hatching						
	Concentration of diflubenzuron in ppm														
	Control	1000	750	500	250	100	50	Control	1000	750	500	250	100	50	
<i>D. cingulatus</i>	212.8	200.0	201.7	198.3	208.6	199.2	200.1	98.1	No hatching	No hatching	No hatching	11.8	29.7	63.8	
<i>C. purpureus</i>	22.3	18.9	19.0	19.0	19.5	19.7	21.7	95.5	No hatching	44.1	53.5	87.4	100.0	100.0	

ance. The same inverse relationship between egg age and susceptibility to diflubenzuron is observed in *Simulium*<sup>3</sup> and mosquito<sup>4</sup> eggs.

The eggs treated with lethal concentrations of diflubenzuron reached a very advanced stage of development, shortly before hatching, making the heads of the nymphs to be seen through the egg shell which was transformed into a highly transparent shell, due to the action of diflubenzuron. The fully developed nymphs could not successfully hatch out of the eggs because the rigidity of the cuticle is lowered due to poor chitin content and finally nymphs fail to resist the muscular contraction during hatching. Similar observation has also been reported by Ascher and Nemny<sup>7</sup> in *Spodoptera littoralis* eggs, treated with diflubenzuron.

Topical application of diflubenzuron on the gravid females does not inhibit the fecundity of both *D. cingulatus* and *C. purpureus*. The eggs laid by *D. cingulatus* treated with 1000, 750, 500 ppm of diflubenzuron are totally suppressed from being hatched while at the concentrations of 250, 100 and 50 ppm the hatching is reduced to about 12, 30 and 64% respectively. However, in *C. purpureus*, the total suppression of hatching is observed only in the eggs laid by females treated with 1000 ppm while at other concentrations upto 250 ppm, the hatching is partially suppressed. In

the light of these observations, it is suggested that the eggs of *D. cingulatus* are more susceptible to ovicidal action of diflubenzuron than those of *C. purpureus* and the direct application of this insecticide on the eggs results in the heavy suppression of egg hatching.

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1. Post, L. C. and Vincent, W. R., *Naturwissenschaften*, 1973, 60, 431.
2. Mulder, R. and Gijswijt, M. J., *Pestic. Sci.*, 1973, 4, 737.
3. Lacey, L. A. and Mulla, M. S., *J. Econ. Entomol.*, 1977, 70, 371.
4. Miura, T., Schaefer, C. H., Takahashi, R. M. and Mulligan, F. S., *J. Econ. Entomol.*, 1976, 69, 655.
5. Ascher, K. R. S., Nemny, N. A., Kehat, N. E. and Gordon, D., *Phytoparasitica*, 1978, 6, 30.
6. Saxena, S. C. and Mathur, G., *Curr. Sci.*, 1981, 50, 336.
7. Ascher, K. R. S. and Nemny, N. A., *Phytoparasitica*, 1974, 2, 132.

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## NEWS

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### WHY DO WE WEEP?

... "Science can now distinguish physiologically between reflex tears (stirred, for example, by onion) and emotional tears (arising mainly from grief or joy). A Minnesota biochemist, William H. Frey II, who directs an ongoing study of tears, has established that emotional tears have a higher protein content than reflex tears. . . . Frey is the only scientist, so far, to concentrate heavily on the chemistry of emotional tears and the biochemical changes related to emotional states. For five years, Frey and his colleagues have been collecting the emotional outpourings of hundreds of volunteers from Minneapolis and St. Paul, who are

subjected to 'four handkerchief' movies to make them start weeping. . . . Such samples permitted Frey to establish the high-protein content of emotional tears. They also led him to a theory he has yet to prove, which is simply that tears, 'like other excretory functions, remove from the body toxic substances that build up as a result of stress. Just exactly what substances, however, Frey does not yet know'. . . . (Reproduced with permission from *Press Digest, Current Contents*® No. 38, September 17, 1984. Copy right by the Institute for Scientific Information®, Philadelphia, PA, USA).

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