Table 1 *Effect of certain high temperatures on the development of Ooencyrtus papilionis Ashmead within the eggs of Pyrilla perpusilla Walker*

Particulars	Temperature (± 1.5 C)	Transfer of host eggs to higher temperature at days after parasitisation 1	2	4	6	8	Development at 27.5 ± 1.5 C
(a) Average number of parasitised eggs female (on the basis of symptoms)	30.0	34 2	33 2	35.2	33.4	34.6	
	32 5	34.4	32.6	35.4	34 2	35 4	34 8
	35.0	35 2[a]	33 6[a]	36.2[a]	34 4[b]	35.2[b]	
(b) Average duration of life cycle (days)	30 0	11.2	11.4	11.6	11.8	12.0	
	32 5	10.6	11.2	11.4	11 6	11 8	12.2
	35 0	—	—	—	—	—	
(c) Percentage of adult emergence	30 0	36.8	87.2	87.6	92.6	95.2	
	32 5	70 4	68.2	69 4	72 8	76 4	97.2
	35.0	0.0	0.0	0.0	0 0	0 0	
(d) Percentage of females	30 0	65.4	66 4	66 8	67 2	66 8	
	32.5	66.2	66.8	65 4	67.3	66 9	66 1
	35.0	—	—	—	—	—	

(Data based on 20 pairs of parasitoid adults)

[a] Only black minute spots on the parasitized eggs were visible through a binocular microscope and the symptoms could not develop further.

[b] Parasitized eggs exhibited clear symptoms but the parasitoid adults failed to emerge from such eggs, because of their mortality.

± 1.5°C on the rate of parasitoid emergence was very pronounced. Rearing at 30 or 32.5 ± 1.5°C resulted in reduced rate of adult emergence (from 95.2 to 86.6 % at 30 ± 1.5°C and from 76.4 to 70.4 % at 32.5 ± 1.5°C). These observations indicated that the younger stages of the parasitoid possessed relatively lower tolerance to temperatures above 27.5°C. The relative sex-ratio of adults at various test temperatures did not differ from that recorded at the normal temperature *i.e.* 27.5 ± 1.5°C.

From the above, it could be concluded that *O. papilionis* failed to complete its life cycle because it died within the eggs of *P. perpusilla* at or above 35°C. The higher the temperature (30 and 32.5 ± 1.5°C) for rearing the parasitoid, the shorter was the duration of development. A mean temperature fluctuating around 32.5 ± 1.5°C seemed to be the upper limit for development and emergence of *O. papilionis*.

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EVALUATION OF DEOILED NEEM (*AZADIRACHTA INDICA* A JUSS) SEED KERNEL AGAINST *TROGODERMA GRANARIUM* EVERSTS.

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NEEM kernel powder[1] and neem seed oil[2] have been reported as effective grain protectants. Very little information is, however, available regarding the mechanism by which the grains are protected[3]. In the present investigation, therefore, studies were conducted to explore the possibility of utilising deoiled neem kernel powder (hitherto not tested for its biological efficacy against stored grain pests) against khapra beetle (*T. granarium*) as also to find out the mechanism involved in the protection of the grain in the storage.

Powdered neem seed kernel was extracted seven times with hexane to remove the oil content. Deoiled powder was further ground in a pestle and mortar and passed through 200 mesh sieve. Fine powder thus obtained was mixed with wheat flour (w/w) in the following manner. Weighed quantity 100 mg of the powder was dissolved in 20 ml acetone (only partly soluble) in a beaker. To this, 10 g of the wheat flour was added and stirred thoroughly. After evaporating the solvent the wheat flour was transferred into specimen tube (10 × 4 cm). Three replications were made for the treatment. Wheat flour treated with acetone alone served as control (two replicates). Ten first-stage larvae were released in each specimen tube and covered with muslin cloth and then transferred to a glass cupboard maintained at 35° ± 2°C and 65 ± 5% humidity respectively. Similar experiment using third instar larvae was also conducted to find out whether the larvae could be controlled at this stage of development. *Trogoderma* larvae were obtained from the culture maintained in the laboratory on wheat flour.

Weekly observations revealed that none of the 30 first instar larvae could develop beyond second instar and all died after the second week while 18 out of 20 larvae released in control emerged as adults. In the other experiment where third stage larvae were introduced all the 20 larvae in control emerged as normal adults by the end of third week while in the treated they were still in larval stage. Out of 30 larvae in the treatment, 5 pupated in the 4th week and one deformed adult emerged in the 5th week. Further development of the remaining larvae was almost completely arrested and all, except one which survived upto 15th week, died by 8th week. None of the pupae could emerge as adult.

Of the several biologically active compounds known to occur in the seed kernel[4] only azadirachtin has been reported to retard the growth and kill the insects by affecting hormonal balance of the insects[5,6]. Since deoiled kernel is reported to be rich in azadirachtin content, the growth retarding effect and the death of the larvae are attributed to the azadirachtin present in deoiled kernel and not due to kernel's antifeedant effect because there was some development in both first and third instar larvae. In the latter case it was more as 5 larvae could develop upto pupal stage and one of them emerged as deformed adult. This suggests that feeding did occur in larvae which affected them adversely. Further it has also been reported that insects fed on azadirachtin treated diet develop at much slower rate than control and many even die at the time of moulting[7].

The present finding offers a very cheap and an effective method for controlling this hard and serious pest of wheat in storage.

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EFFECT OF JUVENILE HORMONE ANALOGUE ON THE EGG NUMBERS AND EGG VIABILITY IN DIFFERENT EGG CYCLES OF THE BUG, *DYSDERCUS KOENIGII* FABR

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INVESTIGATIONS have shown that juvenile hormone analogue (JHA) adversely affects both fecundity and fertility of insects[1-3]. But in none of these studies, a correlation between the JHA effects on these parameters of reproduction could be established. The data presented in this note show such a correlation.

Dysdercus koenigii shows 6 egg cycles under laboratory conditions; the first one in 6 to 7 days after adult emergence and the rest at intervals of 3 to 4 days after the first. Ten to 12 hr old adult females were given a topical application of 10 and 100 μg of JHA R-394 (ethyl 9-cyclohexyl-3, 7-dimethyl-2,4 nonadienoate, kindly supplied by Dr Streinz of the Academy of Sciences, CSSR) dissolved in 1 μl of acetone, controls receiving 1 μl of acetone alone. The insects were provided with young adult males for mating and the