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# Management of the rice leaffolder, C*naphalocrocis medinalis* (Guenee) by newer insecticides

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## ABSTRACT

*Nine insecticides viz., clothianidin 50WDG, flubendiamide 20 WDG, flubendiamide 480 SC, ª-cyhalothrin 5CS, indoxacarb 15EC, acetamiprid 0.4% + cypermethrin 2% EC,acetamiprid 0.4% + quinalphos 20% EC, acetamiprid 0.4% + chlorpyriphos 20% EC and monocrotophos 36 WSC (check) were evaluated in the field during wet season, 2004 and 2005 against the rice leaffolder, Cnaphalocrocis medinalis (Guenee) @ 15, 25, 24, 12.5, 30, 60, 510, 510 and 500 g a.i. ha$^{-1}$, respectively. The results revealed that out of nine insecticides sprayed at 20, 40 and 60 days after transplanting, the per cent leaf damage due to leaffolder incidence recorded the lowest (1.81%) with ª -cyhalothrin registering 70.13% reduction over control followed by the newer insecticides indoxacarb (62.21%) and flubendiamide (60.56%). In other treatments the level of suppression was not satisfactory.*

***Key words:*** *Rice leaffolder, Cnaphalocrocis medinalis, control, insecticides*

The rice leaffolder, *Cnaphalocrocis medinalis* (Guenee) was considered as minor or sporadic pest in the past in many Asian countries, but now it has assumed the status of an important pest and has become a major threat to rice production in tropical and sub-tropical Asia (Khan and Joshi, 1990). Both granular and foliar insecticides that are most effective have been identified in the past for control of rice leaffolder (Rao *et al*., 1984; Reddy *et al*., 1987; Prasad *et al*., 1995; Mishra *et al*., 1998; Sehrawat *et al*., 2002) but some of the earlier granular insecticides are now reported to cause leaf-folder resurgence (Panda and Shi, 1989). With a view to replace conventional insecticides with new molecules the present investigation was undertaken.

Field experiments were conducted during wet season 2004 and 2005 in a randomized block design with ten treatments replicated four times at the Central Research Station, Orissa University of Agriculture and Technology, Bhubaneswar. Th e insecticide treatments included clothianidin 50WDG, flubendiamide 20 WDG, flubendiamide 480 SC, λ-cyhalothrin 5CS, indoxacarb 15EC, acetamiprid 0.4%+cypermethrin 2% EC,acetamiprid 0.4% + quinalphos 20% EC, acetamiprid 0.4% + chlorpyriphos 20% EC and monocrotophos 36 WSC (check) @ 15, 25, 24, 12.5, 30, 60, 510, 510 and 500 g a.i. ha$^{-1}$, respectively along with an untreated control. Rice variety "Swarna" was planted in plots of size 5m X 4m at a spacing of 20cm X 15cm with recommended package of practices except plant protection. Foliar application of insecticides was done at 20, 40 and 60 days after transplanting in a hand compression sprayer using 500 litres of spray fluid hectare$^{-1}$. In control only water was sprayed.

Observations were recorded on the per cent leaf damaged by the leaf-folder in 10 randomly selected clumps from each sub-plot of each replication leaving the border rows and then counting the number of leaves damaged by leaf-folder to the total number of leaves present in the selected clump at one day before spraying (DBS) and 5, 10 and 15 days after each spraying (DAS) during both the seasons. The data were then pooled, suitably transformed and analyzed for statistical comparisons.

The results on the efficacy of insecticides in controlling leaf folder (LF) damage (%) during wet season 2004 and 2005 (Table 1) revealed no significant difference in the incidence of leaffolder (LF) one day before spraying during both the years. The LF incidence was comparatively lower (2.56 – 5.99%) during wet season 2004 as against (4.55 – 5.33%) during wet

**Table 1. Efficacy of insecticides on leaf folder (%) damage during wet season, 2004 and 2005 at Bhubaneswar**

| Treatments | Insecticides | Dose (g a.i. $ha^{-1}$) | Leaf folder (%) damage $hill^{-1}$ 2004 1 DBS | 2004 5 DAS | 2004 10 DAS | 2004 15 DAS | Reduction over control (%) | 2005 1 DBS | 2005 5 DAS | 2005 10 DAS | 2005 15 DAS | Reduction over control (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $T_1$ | Clothianidin 50WDG | 15 | 3.60 (2.02) | 2.63 (1.77) $^c$ | 2.76 (1.79) $^b$ | 3.15 (1.90) $^b$ | 41.34 | 5.31 (2.41) | 3.39 (1.96) $^b$ | 3.61 (2.02) $^a$ | 4.34 (2.20) $^b$ | 35.70 |
| $T_2$ | Flubendiamide 20 WDG | 25 | 2.86 (1.83) | 1.17 (1.28) $^b$ | 1.43 (1.38) $^a$ | 1.63 (1.46) $^a$ | 69.65 | 4.97 (2.32) | 2.16 (1.62) $^a$ | 4.29 (2.19) $^a$ | 3.15 (1.89) $^a$ | 53.33 |
| $T_3$ | Flubendiamide 480 SC | 24 | 3.03 (1.86) | 2.00 (1.58) $^c$ | 1.67 (1.46) $^b$ | 2.08 (.59) $^b$ | 61.27 | 5.33 (2.41) | 3.66 (2.04) $^b$ | 4.40 (2.21) $^a$ | 4.59 (2.25) $^b$ | 32.00 |
| $T_4$ | Lambda cyhalothrin 5 CS | 12.5 | 2.65 (1.77) | 0.37 (0.93) $^a$ | 0.57 (1.03) $^a$ | 1.04 (1.23) $^a$ | 80.63 | 4.73 (2.29) | 1.59 (1.44) $^a$ | 3.25 (1.93) $^a$ | 2.59 (1.75) $^a$ | 61.63 |
| $T_5$ | Indoxacarb 15% EC | 30 | 2.56 (1.74) | 0.94 (1.20) $^a$ | 1.22 (1.30) $^a$ | 1.49 (1.40) $^a$ | 72.25 | 4.90 (2.32) | 2.15 (1.62) $^a$ | 3.22 (1.92) $^a$ | 3.09 (1.88) $^a$ | 54.22 |
| $T_6$ | Acetamiprid 0.4% + cypermethrin 20% EC | 60 | 4.36 (2.20) | 3.18 (1.91) $^d$ | 4.04 (2.12) $^c$ | 4.47 (2.22) $^c$ | 16.75 | 4.86 (2.31) | 3.66 (2.03) $^b$ | 4.20 (2.14) $^a$ | 5.27 (2.40) $^b$ | 21.93 |
| $T_7$ | Acetamiprid 0.4% + quinalphos 20% EC | 510 | 3.35 (1.93) | 2.43 (1.71) $^c$ | 3.34 (1.95) $^c$ | 3.93 (2.08) $^c$ | 26.82 | 4.55 (2.24) | 3.83 (2.07) $^b$ | 3.92 (2.05) $^a$ | 4.92 (2.32) $^b$ | 27.11 |
| $T_8$ | Acetamiprid 0.4% + chlorpyriphos 20%EC | 510 | 5.99 (2.45) | 3.09 (1.89) $^d$ | 3.73 (2.04) $^c$ | 3.84 (2.07) $^c$ | 28.49 | 5.07 (2.34) | 4.04 (2.13) $^b$ | 4.79 (2.29) $^b$ | 4.83 (2.31) $^b$ | 28.44 |
| $T_9$ | Monocrotophos 36WSC | 500 | 3.78 (2.05) | 2.69 (1.77) $^c$ | 3.19 (1.92) $^c$ | 3.31 (1.94) $^c$ | 38.36 | 4.89 (2.32) | 3.97 (2.11) $^b$ | 4.90 (2.31) $^b$ | 4.62 (2.26) $^b$ | 31.56 |
| $T_{10}$ | Untreated Control | - | 4.44 (2.22) | 4.42 (2.20) $^e$ | 4.87 (2.31) $^c$ | 5.37 (2.41) $^d$ | - | 5.30 (2.40) | 5.46 (2.43) $^c$ | 7.31 (2.79) $^c$ | 6.75 (2.69) $^c$ | - |
| | SE m(±) | - | 0.17 | 0.10 | 0.12 | 0.11 | - | 0.09 | 0.10 | 0.12 | 0.11 | - |
| | CD (P=0.05) | - | NS | 0.29 | 0.36 | 0.32 | - | NS | 0.29 | 0.36 | 0.32 | - |

season 2005 at 1 DBS. During wet season 2004, at 5 DAS all the insecticides evaluated brought about significant reduction in leaf damage (%) compared to control. Indoxacarb and λ-cyhalothrin were the best among insecticides evaluated at this stage. At 10 DAS, the treatments $T_2$, $T_4$ and $T_5$ (0.57–1.43%) recorded significantly the lowest LF incidence followed by $T_1$ and $T_3$ (1.67–2.76%). Rest of the insecticides were ineffective and on par with control (4.87%). At 15 DAS, all the treatments proved significantly better (1.04–4.47%) in controlling LF damage (%) compared to control (5.37%) with $T_2$, $T_4$ and $T_5$ (1.04–1.63%) registering significantly lowest incidence. The highest per cent reduction recorded due to LF incidence ranged from 69.65–80.63% with λ-cyhalothrin, indoxacarb and flubendiamide.

During wet season 2005 at 5 DAS the treatments $T_2$, $T_4$ and $T_5$ (1.59 – 2.16%) recorded significantly lowest LF incidence (%) followed by $T_1$, $T_3$, $T_6$, $T_7$, $T_8$ and $T_9$ (3.39 – 4.04%), which were on par with each other but differed significantly from control (5.46%). At 10 DAS, seven insecticides (3.22 – 4.40%) except $T_8$ and $T_9$ (4.79 – 4.90%) registered significant reduction in the incidence of LF compared to control (7.31%). At 15 DAS, the treatments $T_2$, $T_4$ and $T_5$ (2.59 – 3.15%) registered highest reduction of LF incidence with 53.33 to 61.63% reduction over untreated check. In other treatments the LF damage reduction was not satisfactory (21.93–25.70%).

Thus, from the present findings it may be concluded that λ-cyhalothrin @ 12.5 g a.i.ha$^{-1}$, flubendiamide @25 g a.i. ha$^{-1}$ and indoxacarb @ 12.5 g a.i. ha$^{-1}$ were significantly superior in suppressing leaffolder incidence. Earlier, Chalapati Rao and Singh (2002) reported λ-cyhalothrin (25 g a.i. ha$^{-1}$) to have lowest leaf folder damage. Hegde and Srinivas (2003) investigated and concluded that λ-cyhalothrin 5 EC at 500 ml ha$^{-1}$ was highly effective against the leaf-folder. Subash Chander *et al.* (2003) reported that λ-cyhalothrin at 25 g a.i. ha$^{-1}$ recorded lowest damage against leaf-folder. The annual progress report of DRR (2004) revealed that flubendiamide and indoxacarb were highly effective against the rice leaffolders. The findings of the above workers corroborated with the present finding.

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