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# INTEGRATED MANAGEMENT OF RICE GUNDHI BUG (*Leptocorisa acuta*): RICE EAR-HEAD BUG

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## ABSTRACT

**R**ice is a monocotyledonous self-pollinated crop belongs to the family Poaceae (Gramineae) and the genus *Oryza* includes 24 species, of which 22 are wild and two namely *Oryza sativa* & *Oryza*

*glaberrima* are cultivated. All the varieties found in Asia, America, and Europe belong to *O. sativa* and varieties found in west Africa belong to the species *O. glaberrima*. It is the staple food of more than 60% of the population of the world. And it was high-energy or high-calorie food. It contains 6-7% protein, 2.0-2.5 % fat, and a low percentage of calcium and B Group vitamins. Rice is cultivated mainly in Asian countries viz. India, China, Nepal, Japan, Srilanka, Pakistan, Bangladesh, etc. Rice gundhi Bug (*Leptocorisa acuta*) frequently causes extensive damage to rice crops. Its broad distribution in rice-producing countries like China, India, Australia, Bangladesh, Nepal, Burma, Fiji, Indonesia, Malaysia, Papua New Guinea, The Philippines, Thailand, & Samoa as well as in several Central American countries, etc. The adult of *Leptocorisa acuta* is long (14-17 mm) & slender (3-4 mm wide), light yellow-green to yellow-brown color. Females lay eggs in 10-20 batches in rows on the upper surface of the leaf blade. In the case of bugs present 5 wingless nymphal instars with a total nymphal period of 25-30 days. Pale yellow-green colour and long antennae are major characteristics of Nymphas. Bug adults are crepuscular (active during the early morning & late afternoon). Males live shorter than females on average: 48 and 60 days, respectively. The rice bug both nymphs & adults causes damage by feeding on the sap of milky grain & turns them chaffy. The cultural practices should be done through the removal of alternate hosts, especially graminaceous weeds and irrigation should be managed to avoid excess humidity. Resistant varieties should be taken into practice in infested areas for Sathiya in UP, Sona in Bihar, and Mudukuttin in Chennai. Chemical controlled by spraying of methyl parathion 2% dust @25 kg/ha or malathion 5% dust @



30kg/ha or Thiodan 4% dust @20kg/ha or carberri 10% dust @20kg/ha.

**KEYWORDS:**

Rice, Rice Gundhi bug, IPM, cultural practices, chemical control

**INTRODUCTION:**

Rice is a monocotyledonous self-pollinated, Short day and C<sub>3</sub> type plant. It belongs to the family Poaceae (Gramineae) and Its inflorescence is a loose terminal panicle, 7.5-38.0 cm. the fruit of rice is known as Caryopsis. the genus *Oryza* includes 24 species, of which 22 are wild and two namely *Oryza sativa* & *Oryza glaberrima* are cultivated ( Singh, C., et al, 2010 ). The Jaypore tract of Odisha has been established as the center of origin of *Oryza sativa*, the cultivated rice in India (Mishra, 2009). All the varieties found in Asia, America, and Europe belong to *O. sativa* and varieties found in West Africa belong to the species *O. glaberrima*. *Oryza sativa* is a diploid spp. Having 2n=24. Indica, japonica, and Javanica is a subspecies of *Oryza sativa*. Subspecies Indica grows in India, japonica grows in Japan, and subspecies of Javanica are commonly grown in Indonesia. the major characteristics of the Indica subspecies are slightly pubescent & pale green color of the leaf, awnless or possess short and smooth awns, elongated, thin, narrow, and slightly flattened. and the fruit is caryopsis. Japonica varieties mostly have oval & round grains, and narrow and dark green colour of leaves. Grains are awned or awnless. And stiff straw, long panicle with awned grains, long duration, spars tillering and low sensitivity is a major characteristic of the Javanica Subspecies. The commonly cultivated rice plant is an annual and Jointed stem (Known as culm), rather flat leaves and terminal panicle are present. And Rice plant can be

divided into 2 main parts commonly known as the Root and Shoot system. the root system is fibrous & generally remains in the top 20 cm of soil in the case of transplanted rice and the stem or culm is hollow & is made up of nodes and internodes. This was shorter about 90 cm in direct-seeded upland rice varieties and about 130 cm in transplanted lowland rice varieties (Prasad N.,1999). Rice leaf consists of a long sheath & a blade. Leaf-sheath almost completely covers the upper internode. The inflorescence of the rice plant is born on the terminal shoot & is known as the panicle. Panicle of rice is terminate type & at maturity is droopy. In the case of Direct seeded upland low-yielding varieties have generally 3-4 panicles/plant, and the lowland high-yielding varieties have generally 6-10 panicles/plant (Prasad, R. et al.,2012). Yoshida et al.(1972) observed stiff and short stem, upright and compact tiller, and profused tillering. Short, Thick, small & erect leaves and longer & heavier panicles are the characteristics that impact high yield in rice varieties. Caryopsis is a type of rice fruit in which a single seed is fused with the wall of the pericarp (Ovary). In the case of rice plants vegetative & reproductive phases are nearly equally divided. Panicle initiation, panicle emergence, flowering, grain filling, milk or milk dough & ripening is a phase of the reproductive life cycle. Photoperiod-sensitive phase (PSP) is also known as the Vegetative lag phase. And its duration may last 10 To 20 days or more. PSP is present only in long-duration varieties & is b/w the end of the vegetative stage and the start of the panicle-initiation stage. Rice is a staple crop that is cultivated in diverse Agro-ecosystem. This crop occupies a key position in Indian and Nepali Agriculture. This was the primary source of energy. This was cultivated in Asian countries viz. India, China, Nepal, Japan, Srilanka, Pakistan, Bangladesh, etc.



Rice is the most preferred staple crop, grown by 76% of all agricultural households in Nepal (Sanogo and Maliki Amadou 2010). Rice is produced mainly in the Terai Region & it contributes to the livelihood of a majority of farm households in the area. Despite its special significance, Rice productivity remains poor & uncertain (MoF 2013; Khanal et al. 2018). In our country, Nepal 70% of the total rice produced is used for Home consumption. The total area under rice cultivation in the world is about 153.9 million ha, & the production is about 618 million tonnes. India occupies the 1st position in the area, followed by China & Indonesia. China Occupies the 1st position concerning production, followed by India & Indonesia. So far the USA Occupies 1st position in the productivity, followed by Japan & China. In contains Nepal; Province 2nd 1st position in large area and production, orange district first position in the area of cultivation and jhapa district in the position of first in production, bhakthpur, bara and parsa District position in 1st, 2nd and 3rd in productivity.

### **RICE BUG:**

*Leptocorisa acuta* is commonly called a “Gundhi bug” it was an important and common pest of rice. Its frequently causes extensive damage to rice crops. The rice bug both nymphs & adults causes damage by feeding on the sap of Milkey grain & turns them chaffy. Rice gundhi bug is one of the serious pests in the rice-growing area of India and its distribution extends over the whole of South Asia from china and japan to the north. Its also found in Philippines and Australia. Its broad distribution in rice-producing countries like China, India, Australia, Bangladesh, Nepal, Burma, Fiji, Indonesia, Malaysia, Papua New Guinea, The Philippines, Thailand, & Samoa as well

as in several Central American countries, etc. In India, its attack is siever in U.P. and Bihar, and in Nepal, its attack is siever in all rice cultivated regions like jhapa, bara, parsa, rupandehi, kapilvastu, and bhakthpur district. Host plants for *Leptocorisa acuta* are paddy, jowar, bajra, maize, smaller millet, and many types of grass.

### **LIFE CYCLE**

There is 3 development stage; egg-Nymph-Adult (incomplete metamorphosis) are found which are in their life cycle.

2.1 Egg- eggs are laid by female adults bug in the month of July-August. They are deposited in 3 strips on the lower side of a leaf. each strip contains 10-20 eggs. And about 40 eggs are laid at the place. The eggs are blackish brown, small bead-like in structure depending on prevailing temperature. The eggs hatch in about 4-7 days. at the time of hatching color changes to black. Nymphs come out of the egg. the length of the egg was observed to range from 0.76-1.2 mm and the average width of the egg was varies from 0.45-0.83 mm.

2.2 Nymph- the slender greenish nymph hatch out of an egg and start sucking the plant juice .at hatching time is 1.8 mm long and 2mm within 6 hrs. There are five molds (mouths).which after which the nymph becomes adults. The nymphal period is of 14-20 days the full grow nymph measure 15 mm long and become an adult. There were five nymphal stages where the insects molted between each stage. Freshly hatched nymphs (first instar) were pale greenish and had long reddish antennae with whitish bands.

A. The duration of the first instar nymph lasted for 2-4 days, Length were 1.5-2.1 mm and with were 0.35-0.6 mm.

- B. The duration of the second instar nymph lasted for 3-5 days ranging from 5.6-6.3 mm in length and 0.62-0.9 mm in width.
- C. The duration of the third instar nymph lasted for 3-5 days and reached up to 7.8-10.1 mm in length and 0.9-1.99 mm in width respectively.
- D. The duration of the fourth instar nymph lasted for 3-6 days, The length and width of the 4th instar nymph varied from 11-13.2 mm and 1.31-1.62 mm respectively.
- E. The duration of the five instar nymph lasted for 3-6 days, in its was 13.15-16.5 mm and 1.6-1.8 mm in length and width respectively in the 5th instar

2.3 Adult-the adult bugs are about 15-16 mm long. Slender and greenish-yellow in color. Head is small and provided with 4 segmented rostrums. The antennae are larger than the body and red. Study length and width of adult females were observed greater than adult males and it was ranged from 15.8-17.5 mm in length and 2-3 mm in width whereas the length and width of adult males varied from 14-15.5 mm and 1.6-1.8 mm respectively. The total life cycle is completed in 21-31 days and several overlapping generations are found but on paddy 4-5 generations are completed. The bugs copulate after 12-14 days of emergence and females survive up to 55 days and males only for 33 days. the pest passes and other plants continue their life cycle.

#### **NATURE OF DAMAGE:**

A most serious pest of paddy crops both Nymph and Adults most suck the juice initially from leaf and tender shoots and later from the ears. Although it feeds a variety of plants but creates a serious problem when grain formation is in progress in the paddy. it sucks the milky juice leaving the white chaffy husk. A hole is left on the grain where bug

punctures with it are pro basis and around which a brownish spot is developed due to fungus attack its attack can easily be recognized by unpleasant about which comes from the field, where its present and due to which name gundhi has been given. The insect is very common in paddy fields from the middle August-middle November and causes 20-30% damage to crops in case of severe infestation. Practically all the grains of all the ear-heads where become chafed. During 1958 in areas in epidemic from Assam, Bihar, MP & UP and control operations were undertaken in the whole of 484168 acres of paddy field in UP.

#### **INTEGRATED MANAGEMENT:**

Cultural methods: cultural control measures include the removal of alternate hosts such as grasses (*sama-Echinochloa colona*) on bunds & Rice fields, adopting early planting, and the use of late-maturing cultivars. Strict vigilance is necessary at the milky stage. Keep the field and bunds free of weeds and grasses. Netting and handpicking the bugs reduce their numbers. Putting attractants such as artisan on anything with an odor like dead snails or rats can easily capture rice bugs in the field. Coarse-grain and beard cultivars may be resistant to the rice bugs. Select the crop with the same maturity date in the locality. Use legume-based crop rotation every year. Level the rice field uniformly to ensure even distribution of fertilizer & irrigation water to grow the paddy crops at the same rate.

Mechanical methods: A collection of the bugs with a hand net & their destruction is a useful mechanical method.

Biological methods: Among the biological control agents, small wasps parasitize the eggs and meadow grasshoppers

prey on them. Both the adult & nymphs are prey to spiders, coccinellid beetles, and dragonflies. A fungus infects both nymphs and adults. Avoid the use of chemical pesticides so that the field is a suitable environment for natural predators of rice bugs such as tiger beetles. Trap adult bugs using a light trap @3 traps per 20 ropani.(Source- Knowledge Bank)

**BOTANICAL METHODS:**

Use any one of the following.

Neem seed kernel extract 5% @25kg/ha

Notchi leaf powder extract 5%

Ipomoea leaf powder extract 5%

Prosopis leaf powder extract 5%

Use a dirty trap: use a dirty trap ( @1 trap per ropani) of cattle urine/dung and then destroy the traps by suitable means. Keep on hanging the cattle urine-soaked gunny bag or cow dung-wrapped cloth in the field, just at the height of the crop to attract the bug.

**CHEMICAL METHODS:**

The dusting with anyone of the following insecticides have been found effective:

1. Methyl parathion 2% dust @25kg/ha
2. Malathion 5% dust @30kg/ha or malathion 50 EC @ 2ml/lit(350 ml /acre)and take up spraying on panicle.
3. Thiodon 4% dust @20kg/ha
4. Carbaeyl 10% dust @20kg/ha
5. Cypermethrin 25% EC @ 0.5 ml/lit.water

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