

Appraisal Of Morphological Innuendos Of Conflicting Rice Varieties (*Oryza sativa*) In Relation To Insect-Pest Assails Throughout *Kharif* Season

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Abstract: Rice is the staple food of the most parts of Asia continent. South Asian people deeply include rice in their tradition and culture other than its economic and strategic importance. Most of rice plant parts are exposed to pest attack from period of sowing till harvest. Insects damage plant parts by chewing plant tissues, boring into stems or sucking fluid saps from stem and grains. Damages were caused by insects disturb physiology of plants and result in to less crop yield. Rice plants are attacked by a number of arthropods (insect-pest) namely yellow stem borer, whorl maggot, leaf folder, rice hispa etc. So, it was investigated to show the morphological indices of different rice varieties (*Oryza sativa*) in relation to insect-pest attack during *Kharif* Season. The dead heart (*Scirpophaga incertulas*) damages are directly proportional to the tillering stage and reproductive stage of rice plant due to have maximum number of tillers, the cultivar is much affected by DH. The leaf folder (*Cnaphalocrocis medinalis*) damages are directly proportional to the leaf breath and flag leaf breath due to have the maximum leaf breath and flag leaf breath, the cultivar is much affected by LF damage. The whorl maggot (*Hydrellia* sp.) damages are directly proportional to the leaf length and flag leaf length. The rice hispa (*Dicladispa armigera*) damages may be related with the times of plant maturing and tillering. The white ear head (*Scirpophaga incertulas*) damages are directly proportional to the panicle length and panicle bearing tillers. In rare case, it is shown that dead heart damages may be increased by raining.

Key Words: Dead heart, White ear head, Yellow stem borer, Rice leaf folder, Whorl maggot, Rice hispa, *Kharif* season.

1. INTRODUCTION:

Rice is the staple food of most of the parts of Asia continent. It is also a source of income for more than 50 million households. After India and Bangladesh, the other three major rice growing countries in South Asia are Pakistan, Nepal and Sri Lanka which together have little more than 5 million [1]. Rice is the seed of the grass species *Oryza sativa* (Asian rice) or *Oryza glaberrima* (African rice), belongs to the Family: *Poaceae*, Genus: *Oryza*. It is grown at an angular distance above the horizon or can say at an elevated geographical formation. Autumn (Aus), Winter (Aman) and Summer (Boro) are the three seasonal paddy crops cultivated in India. As per as the time of harvest these crops are named, such as - November/December to April/May Boro is cultivated which is 28% of the total rice area and Boro production of rice is 34% of total rice production. Again from July/August to October/November Aman is grown. Aman / *Kharif* area is the predominant of three (68%) of the total rice area and production of rice is 63% of total rice production. From May/June to September/October Aus is harvested, Aus is only 4% of the total rice area along with production of 3% of the total rice production [2]. Insects pest of rice cause the loss of grain yields in all rice ecosystem.

2. LITERATURE REVIEW:

1) Harmful Insects' Activities in rice ecosystem

To some extent such estimates are inflated by the high incidence of insect's activity in the tropics and by inadequate pest control programmer in many developing countries. Among the cereals, rice is the most important cereals in West Bengal. A number of harmful insect-pests in the rice field are very much important biotic stresses that hamper rice production. Economic loss of rice plants are attacked by a number of arthropods (insect-pest) namely yellow stem borer, whorl maggot, leaf folder, rice hispa etc [3,4].

2) Yellow stem borer (*Scirpophaga incertulas*)

Most of rice plant parts are exposed to pest pummel from period of sowing till harvest. Insects mutilate plant parts by chewing plant tissues, boring into stems or sucking fluid saps from stem and grains. Damages caused by insects

muddle physiology of plants and concomitant in to lower crop yield [5]. The populations of yellow stem borer discriminated significantly among different rice growth stages arraying the relative profusion 69.90%. The highest number of yellow stem borer was found in tillering stage (30.17) and lowest in seedling stage (12.08) [6]. Yield loss due to insect pests of rice has been reckoned about 30-40% [7]. The rice stem borers are the principal devastators and responsible for economic crop losses under field condition [8]. They are common and consequential pests in Asian countries culpable for annual damages of 5-10% of rice crops [9]. Copiously infestation may beget yield loss up to 80%. Drying of panicles (white ear head) or central shoot (dead hearts) are visible auguries. Panicles or shoot can be bowed out easily in such cases. The larvae of yellow stem borer infiltrate the stem at vegetative or reproductive stage mostly from the nodal region. Larval feeding causes death of central shoot at vegetative stage or panicles at reproductive stages. YSB is the most catastrophic insect pests of rice crop [10]. Rice plants are most prone to stem borer infestation at the tillering and flowering stages [11]. Although stem borer detriment becomes perceptible only as dead heart and whitehead, significant losses are also inflicted by larvae that feed within the stem without severing the growing plant parts at the base. Such damage results in diminished plant vigor, fewer tillers, and many unfilled spikelets. The 23 individual rice cultivars are planted is both shallow and semi-deep locus, perpetuating the replicated yield Trial (RYT) with RBD. Field investigation is clearly evincing that the NDR 8027, rice cultivar is highest swayed by *Scirpophaga incertulas* (in case of DH) and also has maximum No. of tillers in both shallow and semi deep condition. The OR 2329-2 is less affected by DH and also has minimum No. of tillers in both shallow and semi deep condition. The RAU 1407-7-1-3-4 is much affected than any other varieties by *Scirpophaga incertulas* (WEH) in both condition and also has highest No. of panicle bearing tillers and longest panicle length. The NDR 8027 is less affected than any other rice cultivars in both conditions and has lowest No. of panicle bearing tillers and shortest panicle length in both plights. The mean AV.% of all pest attacks in SHW is higher than the mean AV.% of all pest pounces in SDW. The plant height of aberrant 23 rice cultivars in semi-deep land situation is larger than shallow land locale [12]. Stem borer *S. incertulas* usually comprehended more than 90% of the borer population in rice. The onset of flooding and stem elongation catered a more favourable environment for *S. incertulas* [13]. Early strikes caused drying of the tiller, a phenomenon known as the "dead heart"; when attacks betided at the flowering stage it instigated the dryness of the panicle and the instance is known as the "white panicle" [14].

3) Rice leaf folder (*Cnaphalocrocis medinalis*)

Cnaphalocrocis medinalis is the best known leaf folder species in Asia. The adult moths are 10-12 mm long. They are light brown with shiny, brownish yellow wings adorned with dark. The freshly hatched larva is 1.5-2 mm long and 0.2-0.3 mm wide, has a shiny translucent body and a light-brown head. The body turns green after the larva begins feeding. The first-instar larva feeds on the young leaves by scraping the leaf surface, but it does not cause the leaves to fold. Its body usually is covered with a silky material. Five larval instars are completed in an average period of 20-30 days. The larvae from the late second instar onward can cause the leaves to fold. The caterpillar secretes a series of threads and uses these to connect the two margins of a leaf blade. The threads contract as they dry and bring the two leaf margins together, turning the leaf blade into a tubular structure. The larva remains within the leaf blade and feeds on it by scraping the leaf surface, thus causing longitudinal, white, transparent streaks on the leaf blade. If a blade is acutely damaged, the larva migrates to other leaves [3]. Second instars larvae fold the leaf and feed inside. In cases of severe infestation, the leaf margins and tips are dried up and crop gives a whitish advent [15]. Loss incurred to the growing paddy crop is insurmountable [16]. The RAU 1407-7-1-3-4 is much affected than any other varieties by *C. medinalis* (LF) and also has longest leaf breath and flag leaf breath in both conditions. The Swarna-Sub1 is less affected than any other varieties by *C. medinalis* (LF) and also has shortest leaf breath and flag leaf breath in both conditions [12].

4) Whorl maggot (*Hydrellia* sp.)

The rice whorl maggot *Hydrellia philippina* Ferino was first recorded as an earnest pest of rice in the Philippines in 1962. It is usually observed at the vegetative stage of the rice plant, feeding on the central whorl leaf. Its common name, rice whorl maggot, reflects its feeding habit. The full-grown maggots pupate outside the feeding stalk. The fly maggots feed on the inner margins of unfurled leaves. The newly hatched larvae migrate to the central whorl and feed on the mesophyll tissue. The damage is chewed-up, discoloured areas on the innermost margin of the central whorl. These areas eventually dry up and damaged leaves usually droop. Heavy infestation causes a marked stunting of the plant, fewer tillers [17]. It was observed from the study that the whorl maggot started the infestation at the initial stage of the crop and damaged maximum (22.25 -24.25 damaged leaves/10 hills) in the second fortnight of July. The total rainfall also exhibited marked effect on the multiplication of insect community and population of natural enemies. The results revealed that in both the years the population of insect pests' viz., whorl maggot [18]. Typical damage is degenerated tissue along thinner margins of emerging leaves. As leaves expand, yellow damaged areas become conspicuously visible. Tillering is reduced and maturity may be delayed. Damage occurs from seedling through maximum tillering stages. The LPR 1131 is much affected than any other rice cultivars by *Hydrellia* sp. (WM) and also

has highest leaf length and flag leaf length in both shallow and semi-deep situation. The NDR 9460 is less affected than any other rice cultivars and has the lowest leaf length and flag leaf length in both conditions [12].

5) Rice hispa (*Dicladispa armigera*)

Rice hispa *Dicladispa armigera* (Oliver) frequently stimulates extensive damage to lowland rice crops in Bangladesh, China (including Taiwan), India, Indonesia, Japan, Myanmar, Nepal, Pakistan, West Malaysia, and southern Thailand. The pest is not reported on upland rice and prefers more aquatic habitats. The adult *D. armigera* is a small (5.5 mm long), shiny, blue-black beetle with a spiny body of the leaf blade, generally on the ventral surface, and are relatively inserted beneath the epidermis and tucked with a small quantity of a dark substance probably secreted by the female beetle. Both adults and grubs feed on and damage rice plants. The adults scrape the upper surface of the leaf blade, often leaving only the lower epidermis. The damaged areas appear as white streaks parallel to the midrib. The tunneling of the grubs between the two epidermal layers results in erratic translucent white patches starting from ovipositional sites near the leaf tip and extending toward the base of the leaf blades [19]. The affected parts of the leaves usually wither off. In severe infestations, the leaves turn whitish and membranous and finally dry off [3]. The LPR 1130 is much stayer than any other rice cultivars by *Dicladispa armigera* (RH) in both shallow and semi-deep condition and the OR 2165-5 is less affected than other rice cultivars in both conditions [12].

3. CONCLUSION:

On a global basis ample food is produced to adequately feed everyone. Most of rice plants are exposed to insect pests' damage from the period of sowing till harvest. Pests damage plant different parts by chewing plant tissues, boring into stems or sucking fluid saps from stem and grains. Damages were caused by insects' middle physiology of plants and result in lower crop yield. Huge economic loss of rice plants is attacked by a number of arthropods (insect-pest) namely yellow stem borer, whorl maggot, leaf folder, rice hispa etc. So, it was scrutinized to show the morphological indices of different rice varieties (*Oryza sativa*) in relation to insect-pest attack during *Kharif* season. The dead heart (*Scirpophaga incertulas*) damaged the tillering stage and reproductive stage of rice plant due to have maximum number of tillers and the cultivar is much affected by DH. The leaf folder (*Cnaphalocrocis medinalis*) damaged mainly the leaf length and flag leaf length due to have the maximum leaf length and flag leaf length and the cultivar is much affected by LF damage. The damage of whorl maggot (*Hydrellia* sp.) ruined mainly the leaf length and also flag leaf length. The damage of rice hispa (*Dicladispa armigera*) may be related with the times of plant maturing. The white ear head (*Scirpophaga incertulas*) damages are directly concomitant with the panicle length and panicle bearing tillers. In rare case, it is shown that dead heart damages may be escalated by raining.

4. FINANCIAL DISCLOSURE:

We declare that we have no conflict of interest.

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