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Influences of Moringa Olifera Sead on Corcyra Cephalonica Rice Moth Damaging Rice Lepidopetras: Pyralidae

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Abstract

Rice, also known as oryzasativum, is the most important tropical grain and supplies around one-fourth of the total calories that humans consume on a daily basis. It is the staple food of more people than any other food grains and 90 percent is cultivated and eaten in South and Southeast Asia, which are the center of the world's population. Rice is a member of the Oryza genus, and there are two primary cultivars: Asia and glabemima. There are possibly more varieties of rice than all of the other food grains combined in Africa (Cating David 1992), making it a semi-aquatic gramineous crop of remarkable variety.

The present research discussed about the influences of moringa olifera seed on Corcyra Cephalonia rice moth damaging rice lepidoptera's. The important test grains are rice commonly used as cereals in our country rice was. Procured from the local grain dealer. The quality was tested and confirmed with the help of some agriculturists. These were found quite uninfected germfree. They were thoroughly washed and sun dried. There was no sign of infestation on the grains. It was confirmed after their storage under laboratory conditions for about twenty days. They were roughly washed and sun-dried. It was confirmed after (2020 Year) their storage under laboratory conditions for about 120 days department of zoology and chemistry PPN College, Kanpur.

Keywords: Rice, Moringa Olifera, Corcyra Cephalonica, Rice Moth, Lepidopetras, Pyralidae.

Introduction

The ever-increasing demand for food brought on by the globe's ever-growing population is a significant obstacle for the world today, particularly for the developing countries. In addition to this, it is anticipated that the world population would rise from its current level (2023) of 8 billion to 9.5 billion by the year 2050. Now that it has reached this stage, it has reached a point where the modern methods of agriculture techniques such as irrigation, crop rotation, the application of fertilizers and pesticides, and the use of high yielding and genetically modified

varieties of seed have improved the yield to satisfy the increasing demand. Notwithstanding all of the efforts that have been made to boost production, the loss of yield caused by a variety of variables, including infestation by insect pests, is a serious obstacle to attaining our objective of establishing food security. Over 67,000 different species have been categorized as agricultural pests. They are responsible for around forty percent of the yearly loss of agricultural yields throughout the whole world (Dhaliwal et a l, 2010, 2015). In addition to this, it is predicted that a further twenty percent of the post-harvest output will be lost while the crop is being stored (Aulakh and Regmi, 2013; Basavarajaetal., 2007; FAO, 2001; Oerke, 2006)

Since 1950, the human population has more than doubled, creating an enormous demand for food to sustain the fast-growing population; nevertheless, the amount of land that is suitable for cultivation has only expanded by 10%. The first issue that has to be addressed is how to provide enough food from this restricted amount of arable land without jeopardizing the integrity of the ecosystem. Since there are restrictions on the amount of land that may be used for agriculture, the most expedient answer to this problem is to boost crop production by using fertilizers and chemical pesticides. The land has deteriorated as a direct consequence of the techniques that were implemented in an effort to meet the demand for food.

India is primarily an agricultural nation. Even if there is a significant demand for industrialization and an emphasis on it, agriculture continues to be a prominent industry in terms of its contribution to gross domestic production. For the great majority of Indians, agriculture is a source of work and, as a result, a means of subsistence. In recent years, India's food grain output has grown dramatically. This has mostly been accomplished via the use of improved seed, improved fertilizer, enhanced irrigation, pest control techniques, and increased farmer education. The so-called "self-sufficiency" that India attained in the late 1960s as a result of the "Green Revolution" was mostly accomplished via the use of modern agricultural practices, chemical fertilizers, and pesticides. This accidentally resulted in the destruction of traditional ecosystems and indigenous crop types. Agricultural experts have come to the realization that this is the case, and as a result, they are putting out a lot of effort to find methods that will boost productivity without sacrificing environmental or traditional values.

To ensure that everyone has access to enough food throughout the year, food security is essential. It was a source of worry throughout history. As early as 10,000 years ago, there is evidence that granaries were used in ancient China and Egypt. Among agricultural goods, grains are the ones that may be kept for later use since they are more resilient after harvesting than vegetables or fruits. Since grains are more easily stored and transported than any other crop, any surplus grains that remain after usage may be put to use at a later date. Legumes and cereals are two categories of grains. Peas, beans, lentils, soybeans, peanuts, and other legumes are examples of cereals, whereas maize, rice, corn, wheat, barley, sorghum, and millet are examples of legumes.

More than any other agricultural product, cereal grain is the primary source of food globally. Grains are preserved indefinitely after harvesting and transportation until there is a demand for them. The safe storage of the grains until they are needed, however, presents certain difficulties. Insect infestation, nematode infestation, disease-causing organisms, and rat infestation are the primary causes of loss during storage in the agriculture industry.

An organism that lowers the value, quantity, or quality of a human resource, especially agriculture goods, is referred to as a pest. 2014 (UC-IPM). Plant pathogens (oomycetes, fungus, viruses, bacteria, and nematodes), weeds, invertebrates (mainly insects, mites, and molluscs), and certain vertebrate pests are all examples of agricultural pests. Several countries and regions have distinct pest species. For example, more than 20 important insect species and plant pathogens attack the rice plant (Bonman et al., 1992), while around 50 key insect species and plant pathogens target oilseeds and brassica crops (Lamb, 1989). Insects have been the most significant obstacle for humans from the dawn of agriculture. Insects are the most varied and adaptable species on earth. They may be found in all habitats, including rainforests, deserts, and marshes, and even in very hostile situations such as pools of crude petroleum.

Before or after harvesting, insects destroy agricultural crop. Based on the proportion of damage they inflict, insect pests may be generally divided into three categories. Pests are not defined as insects that cause less than 5% of the damage. Insects that cause damage between 5 and 10% are classified as minor insect pests, whereas insects that cause damage beyond 10% are classified as serious insect pests. There are two types of pest insects: sucking insects and chewing insects. The skin is punctured by sucking insects, which then extract the sap. Plant diseases may sometimes spread via them. The crop insect damages crops by chewing and consuming plant components. Toxins found in the saliva of these insects seriously damage the crop.

The demand for global food security is a significant challenge that the world is now facing since the population of the world is expected to reach nine billion by the year 2050. Thus, there is a need for the development and delivery of efficient, risk-free, and practically applicable solutions for food security and sustainable agriculture. During the whole agricultural production process, crop loss happens. Prior to harvesting, several pests are controlled to prevent infestations, and the most important post-harvest activity is the correct storage of agricultural goods.

Up until recently, a wide variety of chemical pesticides were employed extensively to combat insect pest damage. To avoid agricultural crop loss, pesticides are important. The usage of pesticides may be traced back to ancient Greece and Rome, since Homer makes reference to the fumigant value of burning sulphur about 1000 BC. According to reports, the Chinese utilized nicotine in the form of tobacco extracts and arsenicals as pesticides to suppress plum curculio (Hassal, 1990). With the groundbreaking discovery of DDT in 1939, other pest management strategies have been developed to achieve an almost instant knockdown of the pests. These chemicals continued to be one of the factors that contributed to the achievement of generating high yields in agriculture. However, it was eventually discovered that they were detrimental to all kinds of life, including humans, and that they caused irreparable damage to the environment. It wasn't until Rachel Carson wrote her book "The Silent Spring" in 1962 that the negative impact that pesticides had on the environment was brought to widespread public attention. A global campaign against pesticides was started as a result of this book. (Carson, 1962)

Due to the need to safeguard agricultural goods, pesticides are a crucial tool for contemporary agriculture. It is imperative that we keep in mind the original scientific findings that were published by the WHO in the year 1990. These reports said that the population of developing countries is known to carry significant loads of pesticides in their bodies. Pesticide residues

found in food are the primary cause of this kind of bioaccumulation. The irresponsible use of chemical pesticides has led to a rise in the incidence of a number of illnesses that pose a risk to human life, as well as congenital abnormalities and irreversible harm of the ecosystem. The top five primary causes of mortality globally are all related to exposure to industrial and agricultural pollutants. Annually, it results in nearly one million fatalities and fourteen million disabilities (W.H.O, 2014).

Pesticides used in developing countries have increased significantly during the last several decades. India is one of the first countries in the third world to begin the use of pesticides on a big scale for the purpose of controlling insect pests that are detrimental to public health and agriculture. About 1948 or 1949, India first began using pesticides. The Supreme Court of India has issued a ban on the production, use, and sale of endosulfan, one of the 230 pesticides that have been registered in India up till 2011 (CIBRC 2011).

Rice, also known as oryzasativum, is the most significant tropical grain and accounts for one-fourth of the calories consumed by humans each day. More people rely on it as their primary food than any other grains, and 90% of the world's population is concentrated in South and Southeast Asia, where it is cultivated and eaten. There are two primary cultivars of rice, which is a member of the Oryza genus: There are possibly more varieties of rice than all other food grains combined (Cating and David 1992). Asia and glabemima are semi-aquatic graminaceous crops.

Test insect: Corcyra cephalonica Stainton (The Rice moth)

Corcyra cephalonica, the rice moth (Figure 1) is the so far known living member of the genus Corcyra. It is a pest of stored food products.

Taxonomic Classification

Kingdom	**Animalia**
Phylum	Arthropoda
Class	Insecta
Order	Lepidoptera
Family	Pyralidae
Genus	*Corcyra*
Species	*Cephalonica*

Figure 1: Coreyracephalonica -Adult

It consumes practically all types of stored food commodities, including cereals, cereal goods, oilseeds, pulses, spices, dried fruits, nuts, and biscuits. The rice moth is an exterior feeder of all grains. The webbing of the larvae creates strong and thick grain clusters. The grains will get contaminated by these grain clusters as well as the feces and exuviae of the larvae. The dampness that is produced as a result of the continual production of web will lead to a rise in the prevalence of fungal infection in grains. All of these factors will make the grain unfit for human consumption (Fig 4). Chemical pesticides like malathion and deltamethrin are fumigated or

sprayed from the air to control rice moth populations in warehouses (Daglish, 1998). The life cycle demonstrates full transformation. The adults are nocturnal and will often deposit their eggs during the dark hours of the night. The incubation phase lasts for around three to four days. Soon after hatching from the egg, larvae begin to weave web.

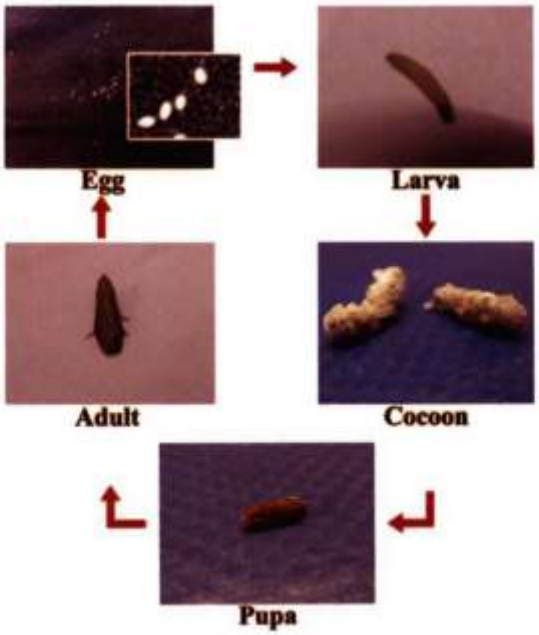


Figure 2: Life cycle of Coreyraeephatoniea

The larval period lasts for about 25-30 days. The last larval instar (LLI) measures about 14-15 mm in size. They pupate within the food. Sex differentiation can be done at the pupal stage based on the distance between the genital pores (located in the abdomen portion).

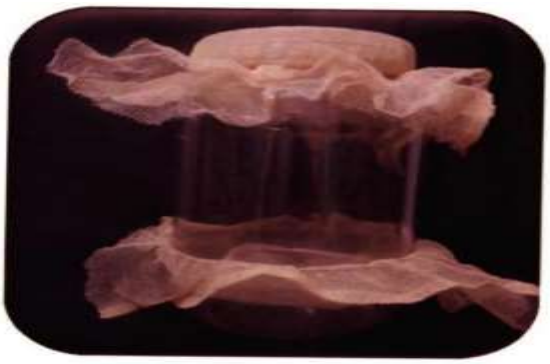


Figure 3: Egg laying apparatus

Greater distance with the V shape mark indicates female, whereas less distance without the V mark indicates male. Sex distinction at the adult stage is based on the structure of the abdomen, i.e., bulged abdomen with anal tuft (also greater size moth) will be female and narrower abdomen will be male. In most cases, moth emergence begins after a charging period of forty days. In the event of a weather-related delay in emergence, it might last between 100 and 120 days. The stage of infestation is the larvae. The webbing of the larvae creates strong and thick grain clusters.

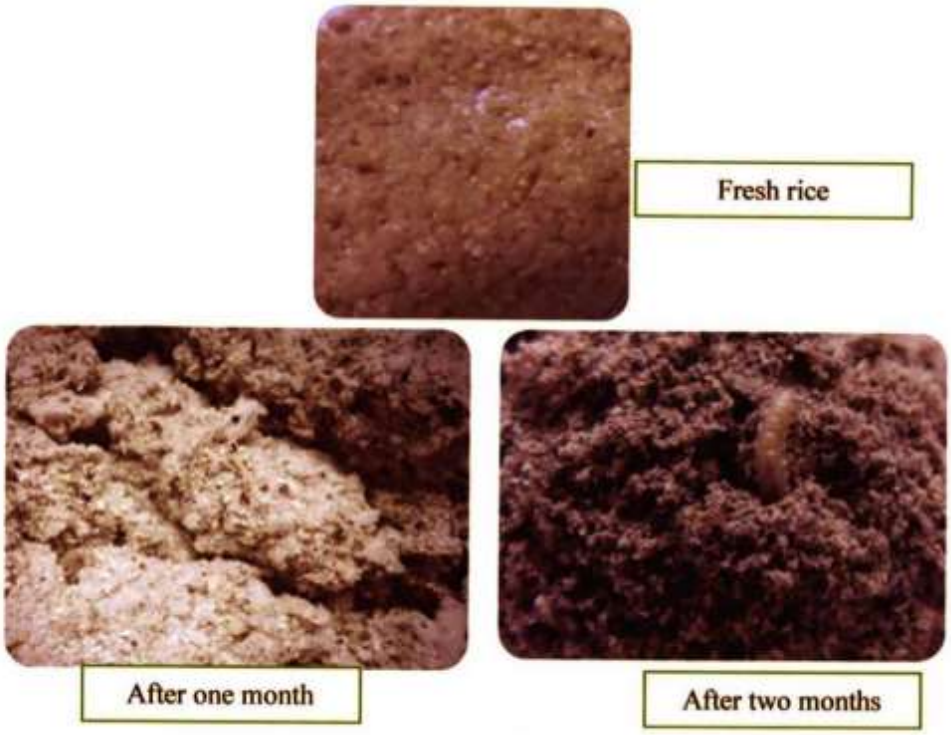


Figure 4: Different stages of infestation office C.cephalonica

The grains will get contaminated by these grain clusters as well as the feces and exuviae of the larvae. The dampness that is produced as a result of the continual secretion of web will lead to a rise in the prevalence of fungal infection in grains. All of these things will render the grain useless for human consumption. Chemical pesticides like malathion and deltamethrin are fumigated or sprayed from the air to control rice moth populations in warehouses (Daglish, 1998).

Material and Methods

The important test grains are rice commonly used as cereals in our country rice was. Procured from the local grain dealer. The quality was tested and confirmed with the help of some agriculturists. These were found quite uninfected germfree. They were thoroughly washed and sun dried. There was no sign of infestation on the grains. It was confirmed after their storage under laboratory conditions for about twenty days. They were roughly washed and sun-dried. It was confirmed after (2020 Year) their storage under laboratory conditions for about 120 days department of zoology and chemistry PPN College, Kanpur.

Result and Discussion

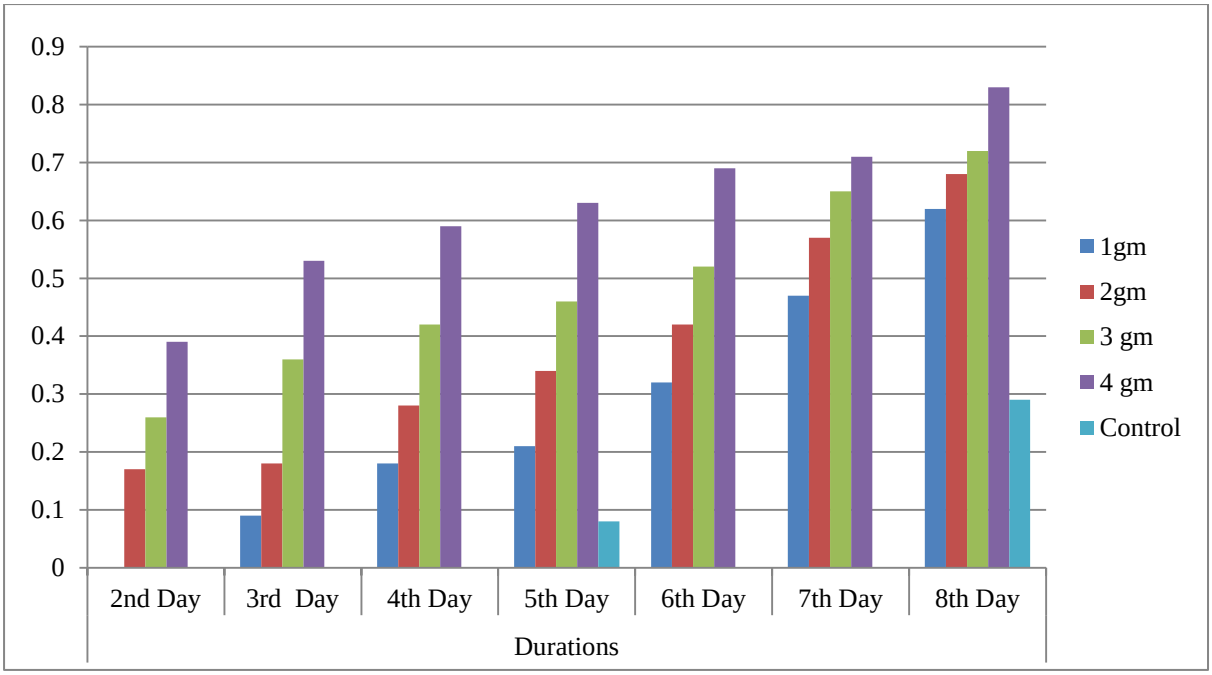
It is recorded that the plant product scared *M olifera* is less toxic.

In 1 gm there was no mortality on the 2^{nd} day, but on the 3^{rd} it was 9%, on the 4^{th} day and the 5^{th} day also 21% on the 6^{th} day 32%, on the 7^{th} day 47% and 8^{th} day 66% mortality was observed noticed. The control did not show any mortality till the fourth day But on the 5^{th} day 88% weevils were found dead. Again on the 8^{th} day registered, a total of 28% mortality was noted in

control.2gms dose treatment recorded in the 2nd and the 3rd day, 17% and 18% on the 4th day, 28% on the 5% day, and 34% on the 6th day and 42% and 57% on the 7thday and 8th respectively.3gms concentration brought 26%, 31%, 42% , 46%, 52%, 65% and 72% mortality on the 2nd day, 3rd day, 4th day, 5th day, 6th day, 7th day, and 8th day, 68% respectively. In 4 gms, exposure caused higher killing. On the 2nd day there was 39% and on the 3rd day 52% mortality was observed 56% on the 4th day, and 63% on the 5th day, 69% on the 6th day and 71% mortality was noticed on 7th day off observation. 10% mortality was added on the 8th day i.e. 83% similar result found Kawakib Awadh Atshan, et al (2017)Effect of seed Extracts as insecticides Against Lepidoptereran Pests on cauliflower, Dhananjay Kumar Tewary, Anu Bhardwaj, etal Pesticidal activities in five medicinal plants collected from mid hills of western Himalayas. industrial Crops and products (2005), Sileshi Degu, Asfaw Berihun, et al Medicinal Plants that used as repellent, insecticide and larvicide in Ethiopia. Pharmacy and Pharmacology (2017), Roger DucosFokouoYoumsi, Patrick(2017) Enthnobotanical Survey of medicinal plants used as insects repellents in six malaria endemic localities of Cameroon. Journal of Ethonobiology and Ethnomedicine., Prof. T.V. Sathe, Dr. Dattatray et al Sucking insect pests and medicinal value of Tulsi Ocimum sanctum L. (Lamiaceae). Indian Journal of Applied Science (2014), Lopamudra Sethi and Preetha Bhadra (2020), Kumari and Kumar (2001), Kumari Punam, Biddhu Sahay Singh and Dhyanendra Kumar (2004), Khatre V.M., Kachora BV. & Mote UN (1993), Pandey Alok Kumar and SP. Srivastava (2007), Pandey Alok Kumar and S.P. Srivastava (2007) A review paper on Tulsi Plant, International Bimonthly., Pandey, N.D, Shiv Raj Singh and G.C. Tiwari: (1976), Pandey Harishankar (1995), Pandey S.C. (1995) Effect of neern leaf powder a survival and mortality of pulse-beetle Callosobruchus chinensis (L) infesting black gram; Srivastava K.P., (2002) is also recorded

Table 1: Effect of Moringa Olifera powder on Corcyra cephalonica(Rice moth)

Doses	**Durations**						
	2nd Day	**3rd Day**	**4th Day**	**5th Day**	**6th Day**	**7th Day**	**8th Day**
1gm M	-	9%	18%	21%	32%	47%	62%
2gmM	17%	18%	28%	34%	42%	57%	68%
3 gmM	26%	36%	42%	46%	52%	65%	72%
4 gmM	39%	53%	59%	63%	69%	71%	83%
ControlM				8%			29%



Graph 1: Effect of *Moringa Olifera* powder on Corcyra Cephalonica (Rice moth)

NOTE: Fig in Parentheses and Transformed Value. M=Mortality

Conclusion

The present research discussed about the influences of moringa olifera seed on Corcyra Cephalonia rice moth damaging rice lepidoptera's. The result shows the plant product seared *M.olifera* is toxic Seed 1gram 4th and 5th days also 21% on the 6th and 7th days 32%and 66% Mortality was noticed. 2 grams 7th and 8th days 42% and 57% respectively 3gram 2days and 3days 26% and 31% respectively in 4grams 2nd and 8^{rth} days 39% to 83% respectively.

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