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Rice Panicle Mite, Steneotarsonemus Spinki Smiley and Its Management

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Abstract

Rice panicle mite, *Steneotarsonemus spinki smiley* (Acari) is a predominant speciesmainly present on rice crop and some other weed hosts. It belongs to family tarsonemidae and order Acarina. Nowadays,it is posingsevere problem and yield losses in rice growing areas. In order to successfully manage them,IPM strategies should be followed. The different IPM practices are*viz.*, cultural, biological, chemical control, etc. Among the control measures the chemical control can effectively control rice panicle mite, *Steneotarsonemus spinki* for instant results.

Introduction

Rice,*Oryzae sativa* L. (Family: Graminae) an important cereal crop is grown successfully in humid to sub humid regions under subtropical and temperate climate. Rice production in the country fluctuates in relation to weather during the crop season. Additionally different categories of pest *viz.*, insects, disease, weeds, nematodes, rats and crabs cause direct and indirect damage at various crop growth stages resulting in reduction of rice yield. In recent year's mite have become a greater concern to the successful cultivation rice in India. Among the mites, sheath mite or rice panicle mite, *Steneotarsonemus spinki smiley* (Acari) is the predominant species, the yield losses due to rice panicle mite ranged from 4.9% to 23.7 % (Rao & prakash, 1996).

Identification

The panicle rice mite is not visible to the naked eye. A minimum 20× hand lens is required to observe it on the inside of the leaf sheath. The mites are clear to straw-colored and are approximately 250 µm in length. The male has elongated rear legs containing a pair of

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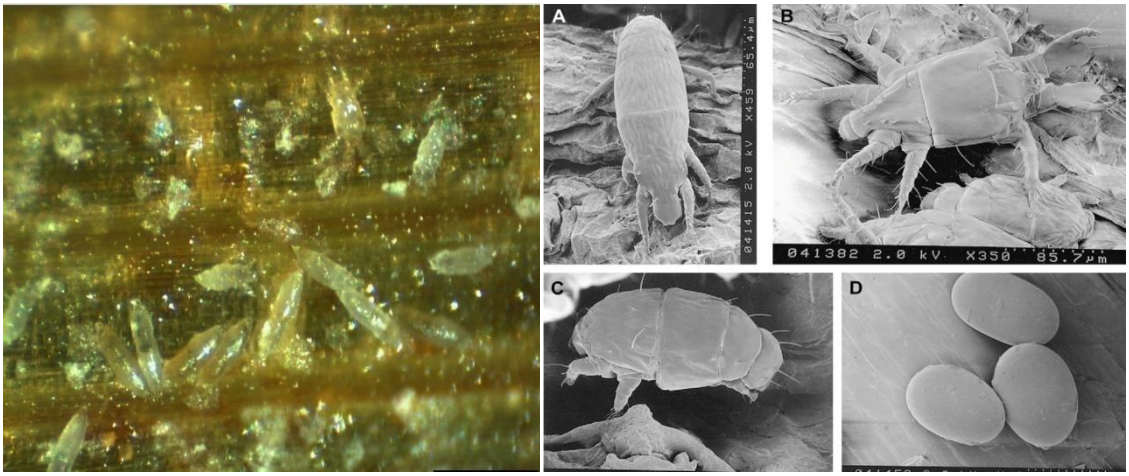
elongated spines. The legs are carried above the body. Males are highly active and can be seen moving on the surface of the leaf. Females are ovoid-shaped. Larval stages, as well as eggs are about half the size of adults.

Life history

- Rice Panicle mites, *S. spinki* has fast and efficient reproduction with females producing 50 to 70 eggs in their lifetimes. *S.spinki* is also arrhenotokous parthenogenetic, where by virgin female produce male off springs.
- The sex ratio of female: male *S spinki* to be 22:1, 32:1 and 8:1at 32^0C, 28^0C under field condition respectively.
- Increasing the temperature results in shorter generation times, 11.3days at 20^0C, and 7.8 days at 23.9^0C and 4.9 days at 33.9^0C and *S. spinki* is able to produce 48 -55 generations per year under ideal climatic conditions.
- Thus, a large population of *S. spinki* can develop very quickly in a rice crop during a single growing season.



Life cycle of rice panicle mite, *Steneotarsonemus spinki* (smiley)

Host plants

- The host range of Panicle mite, *Steneotarsonemus spinki*is currently being investigated. It appears that the preferred host of *Steneotarsonemus spinki* is rice,*Oryza sativa* (L.).
- However, Sanabria and Aguliar (2005) reported American wild rice, *Oryzae latifolia* Desv. As an alternate host for *S. spiniki* in costa and panama. In addition, *C. dactylon* (L) pers. (Poaceae) (Rao and prakash, 1996), *Cyperus iria* L.(Cyperaceae) and

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Schoenoplectus articulates (L.) palla (cyperaceae) have been reported as alternate hosts for *S. spinki* in India.

Nature of damage

- Rice panicle mite,*Steneotarsonemus spinki* feeds by perforating the epidermal cells of the host plant using its stylet. In a rice host, this feeding damage results in brown necrotic regions on upper surface of leaf sheath and on the hull of grain.
- The damage is similar in appearance to that caused by the pathogen *Sarocladium oryzae*. *S.spinki* infestation of rice has been associated with black lesions in the leaf sheath, discolored grains, partial to complete chaffy grains and various malformations in grains (Rao and prakash, 1992).
- Crop losses ranging from 5%-90% have been attributed to parnicle rice mites in a number of countries. In the Americans, however, it has caused the largest economic impact. In Central America it has caused yield losses ranging from 30% to 90%.

Symptoms

- The rice panicle mite can be found in the inner part of the rice sheath and, as the rice grain develops, in the panicles. It is thought that rice panicle mite feeding on reproductive activities and reaches their peak during the milky stage of grain development.
- Symptoms of rice panicle mite infestation include parrot breaking, sterility, grain discoloration and possibly the presence of sheath rot or bacterial panicle blight pathogens.

Symptoms of rice panicle mite, *Steneotarsonemus spinki* smiley

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Management of rice panicle mite, *Steneotarsonemus spinki* smiley:

Cultural control:

- Lo and Ho (1980) reported that high densities of *S. spinki* were associated with high rice planting density and high relative humidity. According to Navia *et al*., (in press)a set of cultural procedures have been established in infested countries to reduce populations of *S. spinki*, delay its arrival into the crop and reduce the yield losses and production.
- The primary methods that are utilized to manage *S. spinki* in infested countries include the following:
- Rice crop residue destruction and removal of invasive plant species that can act as a source of infestation. These measures should be adopted in the production area as well as in neighboring areas.
- Cleaning the new crop areas to remove any remaining mites before a planting a field.
- Clean the machinery and other equipment when used by different farmers or in different areas to avoid the dissemination of mite from an infested area to an uninfested area.
- Avoid planting rice in adjacent areas during harvest time or areas that have rice downwind from an infested field been harvested and always consider the wind direction to avoid planting.
- Divide the doses of nitrogen fertilizers into different treatments.
- Use shallow depth of permanent flood water.
- Monitor the crop 15 days after planting, especially in fields' downwind of infested areas, to ensure early detection of *S. spinki* presence in the crop and implement control measures using acaricides.

Rice varietal resistance to *S. spinki:*

- Levya *et al*. (2003) reported that there was a significant difference in density of populations over time depending on the variety of rice densities of up to 141 *S. spinki* per stem were present on variety J-104 compared to 58 *S. spinki* per stem in Cuba 28. This observation indicated that potential for varietal resistance. The time of peak infestation differed by variety.For example, peak infestation in varietyIA Cuba 28

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occurred from August to September, while the peak variety J-104 occurred in September and December.

Biological control:

- Fungal pathogens and predatory mites may have the ability to suppress populations.

Chemical control:

Because of *S spinki* colonizes a protected area of plant behind the leaf sheath or inside the hulls of developing grains, it will be necessary to develop a systemic miticide to control this pest.

- Most of the miticides that have been used effectively in *S. spinki* infested countries are classified as organophosphates. The pesticide Triazophos (Hostathion 40 Ec) has been reported to effectively control *S. spinki* in Cuba.
- Other products that have been tested under laboratory conditions and reported to cause more than 95% mortality of adult *S. spinki* include Bromopropilato, Diafentiuron, Dicofol and Edifenphos.
- Field trials conducted in India reported up to 90% mortality of *S. spinki* observed with Dicofol 18.5 Ec (Bhanu *et al*., 2006).

Conclusion:

The rice panicle mite, *S. spinki*is the important non-insect pest on rice causing severe losses to farmers.Using different IPM practices have been proved to reduce the mite infestation. Among the different IPMmethods the chemical and biological control methods reduces the infestation efficiently.

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