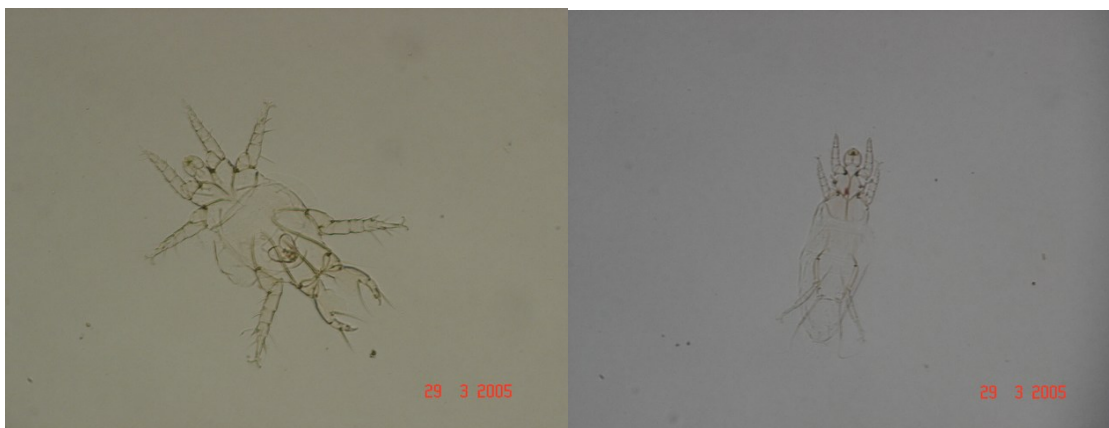


## **The Rice Tarsonemid Mite** *Steneotarsonemus spinki* Smiley

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The rice tarsonemid mite, *Steneotarsonemus spinki* was first recorded in Baton Rouge, LA., USA in 1960 (Smiley, 1967). It has been recognized as an important rice pest in several Asian countries such as China, India, Taiwan, Korea, Philippines, and Thailand. The mite was detected in Cuba in 1997 causing severe yield losses, and subsequently was reported in the Dominican Republic, Haiti, Nicaragua, Costa Rica, and Panama causing 30 to 90% yield reduction. The mite was detected in Colombia in 2005 but in low populations with no significant yield reductions. Larvae and adults of *S. spinki* feed on the rice plant tissue causing browning of leaf sheaths and grain hulls. The main damage is caused in association with the bacterial panicle blight pathogen (*Burkholderia glumae*) and detected during panicle emergence resulting in symptoms known as empty head or grain sterility. Extensive surveys conducted in rice fields in Louisiana in 2005 did not find the mite *S. spinki*.



***Steneotarsonemus spinki*: male (left), female (right)**

The rice tarsonemid mite is normally found associated with the fungus *Sarocladium oryzae* and recently was found in association with the bacterium *Burkholderia glumae*, the causal agent of bacterial panicle blight in Panama (2005 and 2006) and Colombia (2007), where the incidence of affected plants (grain sterility and discoloration) reached 100% causing yield losses above 80%. In the U.S., the mite has recently (August 2007) been identified in Alvin, TX at the RiceTec research facility, the Texas A&M/ USDA ARS facility in Beaumont, TX, and at the winter nursery research facilities in Lajas, Puerto Rico. It has also been found at the LSU rice station in Crowley, LA. Although the mite has primarily been found in greenhouses, it has also been found in some research fields where greenhouse plants had been planted. The facilities in Stuttgart are currently being inspected by APHIS. The locations where the mite has been found are under strict quarantine restriction. The restriction limits access and the infected plants are being sprayed with a series of miticides over a 6 week period. Areas will be inspected for the mite following treatment.

As a precaution to prevent the introduction of the mite into the Stuttgart area, beginning in 2005, rice seed coming from Puerto Rico has been stored in a freezer for a minimum of 72 hours prior to planting.

The life cycle (egg to adult) of the mite takes 3-10 days depending on the temperature and relative humidity. An adult female lays about 60-75 eggs in 10-15 days and 48 to 55 generations can be completed in a year. The main host of the mite is the rice plant. The optimal conditions for the growth and reproduction of the mite are 25-27°C and relative humidity above 80%. Periods of sunny days and low rain favor mite development but low relative humidity and heavy rains increase mortality reducing the mite population.

The mite can be disseminated on seeds, by wind, water, insects, agricultural machinery, and survives on plant debris after harvesting. It can be detected on young plants when infested seed is planted or if neighboring fields were heavily infested. The milky stage is preferred by the mite for feeding and its reproduction. The mite is mainly detected in the inner part of the leaf sheath where high populations of nymphs and adults can be found. It is mainly found in the upper part of the sheath close to the leaf, but can also be found in the middle or lower part of the sheath. Small brown spots on the sheath are indications of mite presence. The mite can also be found on the endosperm and the inner part of the hulls. It is sometimes difficult to detect in the field because of its transparent appearance, small size (195-265µm x 92-109µm), and preferred location in the inner part of the sheaths. However, a 20X magnifier can be used for detecting individual mites or detecting colonies which can reach populations of 300 mites/cm<sup>2</sup>.



**Browning on the grains and sheaths caused by the association of *Steneotarsonemus spinki* and *Burkholderia glumae***

Heavy infestations of the mite occur during the rice reproductive stage helping to disseminate the bacterium *B. glumae* causing erect or deformed panicles and turning the surface of grain brown to dark black. Affected panicles contain a mixture of green, tan, and brown kernels. The mite apparently injects a toxin that can cause grain deformation. Grain quality and milling can be affected. Leaf sheaths exhibit browning symptoms. All

symptoms observed are similar to those caused by the bacteria panicle blight and sheath rot pathogen, which are normally found in association with the mite.

There are several management practices that can help control the rice tarsonemid mite avoiding broad dissemination of the bacterium *B. glumae*. To prevent the introduction of the mite into a new crop, it is necessary to destroy plant debris after harvesting infested fields, and disinfect the rice seed before planting. In the tropics, planting dates should be modified to avoid favorable conditions for mite development during the most susceptible plant development stage of panicle formation and emergence. Differences in resistance to *S. spinki* have been observed among rice varieties, however results are not conclusive. Chemical control is possible but difficult due to the high mite populations observed and the location of the mite in the inner part of the sheath. Cultural practices favoring a healthy crop development such as proper nitrogen fertilization, low seeding rates, destruction of plant residues, good land preparation and leveling and adequate water management help to reduce the problem. Biological control with members of the *Phytoseiidae* family as well as the fungus *Hirsutella nodulosa* has been reported.



**Disease complex of the mite *Steneotarsonemus spinki*, *Burkholderia glumae*, and *Sarocladium oryzae***

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