

# How to Overcome Rice Tungro Virus

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**Tagumpay sa Palay Article for July 2011**

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Pioneer Hi-Bred researchers and agronomists have seen farmers in various parts of South and Central Mindanao struggling against Rice Tungro Virus (RTV). Although some inbred stop gap varieties offer sufficient levels of resistance, the yield level of these varieties are not comparable to those of inbred counterparts in disease-free environments. Unfortunately, none of the high yielding inbred and hybrid varieties is resistant to the virus.

Pioneer Hi-Bred researchers believe that tungro resistance can be attained, and they are working on developing tungro resistant hybrids. As these are not yet available, we are offering the following key pointers in managing tungro in ricefields.

## **Economic Importance**

RTV, which also means 'degenerated growth', can cause 30 to 100 percent yield loss. It was first observed in the Southeast Asia in 1940s, long before the name of the disease was known. International Rice Research Institute first named the disease as dwarfing or stunting. Nowadays, RTV is also called stunt disease, rice cadang-cadang disease, *Penyakit merah* in Malaysia and yellow orange disease in Thailand. RTV was first observed in the Philippines in 1963. It was recorded as the most destructive disease in Mindanao in early 1990s as it damaged almost 10,000 hectares of rice land.

## **Mechanism of damage**

The virus cannot be transmitted without the presence of its vector, the Green Leafhopper (GLH), *Nephotettix virescens*. There are two known types of the virus for the disease to be infectious: the Rice Tungro Bacilliform Virus (RTBV) and the Rice Tungro Spherical Virus (RTSV). RTBV and RTSV have different modes of damage and transmission and disease symptoms.

GLH, locally known as *Berdeng ngusong kabayo* feeds primarily on young rice seedlings. At this stage, the plants are still very succulent and easy to suck. They also easily fed in rice plants applied with high amounts of Nitrogen fertilizers.

GLH are very active and nocturnal, and they use their stylet to acquire the virus. Once GLH feed on a diseased plant, it can easily transmit the virus. The shortest feeding time to get the virus is five minutes and the longer the feeding time, the higher the transmission rate will be. GLH then passes the acquired virus whenever it feeds again on another plant. It can pass the virus to two to three plants and after 2 weeks, the symptoms of RTV can be already be seen on the infected plants. Adult GLH serves as the vector of the virus, and it has a life span of two to three weeks. It has five nymphal stages which can be completed in 16- 18 days.

### **How to detect RTV?**

RTV can be mistakenly compared to other nutrient deficiencies and other rice diseases as their physical appearance are sometimes similarly manifested. However, damages caused by virus can be differentiated from nutrient disorders in the field if the damaged plants are distributed in patchy areas and if the vector is present. On the other hand, nutrient disorder is detected if more or less the whole field is affected. Early symptoms of RTV include discoloration; leaves turn yellow to orange especially the young leaves; uneven plant growth; stunting; mottling of leaves; and less tiller number.

### **Factors favoring RTV**

One of the most contributing factors that favors the disease occurrence of RTV is the non-synchronous planting. In an asynchronous rice area, hosts (which is the rice plants) for GLH will always be present and so the vector will keep on feeding, transmit the virus, lay eggs, and multiply. Other factors include susceptible varieties, excessive application of nitrogen-containing fertilizers and high temperature. The disease is prevalent in irrigated wetland and rainfed environments.

### **Management Strategies**

Plant in synchrony and have the field fallow for at least 30 days. Synchronous planting will help avoid the transmission of virus, and fallow period for at least a month would destroy the insects' life cycle as there will be no hosts and no source of the virus.

Destroy infected stubbles and other hosts. Destroying infected rice plants by way of decomposition, proper plowing, and harrowing can help in total eradication of the virus' sources. It is important to note that weeds are alternate host of the vectors, so proper elimination of weeds could also help in disease prevention.

Plant resistant varieties and know the right time of planting. History of the different diseases prevalent in a certain locality can contribute to knowing the variety that will be most suitable to plant.

In the absence of tungro-resistant hybrids, the different Matatag Lines are recommended for the meantime as these are known to have a resistant reaction to RTV and GLH. It is also important to note the planting calendar, and plant synchronously with the neighboring rice area to avoid source of the disease.

Insecticide Application. Another resort to destroy GLH is spraying of insecticide. Although the virus has been spread and insecticide cannot address the virus, adult GLH can be eliminated by spraying to avoid further laying of eggs. Lannate and Prevathon, both DuPont products, are effective insecticides that can kill the insect vectors and other harmful pests in ricefields.



**Figure 1. Symptoms start to show as stunting and yellowing of few plants which will eventually spread to a large patch in a rice field.**



**Figure 2. Infected leaf blade showing yellowing symptom.**



**Figure 3. A patch of severely infected plants in a field.**

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