Short communication

MANAGEMENT OF RICE SHEATH BLIGHT WITH NEW CHEMICALS IN SRIKAKULAM DISTRICT OF ANDHRA PRADESH

ABSTRACT

Rice is an important food crop grown in Srikakulam district of Andhra Pradesh with 200,000 hectares. Rice crops are affected by various biotic stresses, among which sheath blight is an economically important and destructive disease. Rice sheath blight is one of the most economically important rice diseases in the world. Sheath blight, a soil-borne disease caused by the fungus *Rhizoctonia solani* AG1-IA (Teleomorph: *Thanatephorus cucumeris* (Frank) Donk), is a devastating disease. This fungus belongs to the phylum Basidiomycota, family Ceratobasiaceae. The disease leads to a significant drop in grain yield and quality and yield losses of up to 50% have been reported under the most favorable circumstances. Despite farmers' chemical control measures against the disease, pathogen causes serious early crop losses every year. In this case, KVK Srikakulam conducted on farm trails on Sheath blight management in paddy fields to inform farmers about new and highly effective chemicals during Kharif, 2020 and 2021. A recent new chemical, Azoxystrobin 11% + Tebuconazole 18.3% (T1) at 1.5 ml/l was effective in reducing the incidence of the disease, recorded 88.2% and 81% disease incidence during 2020 and 2021, respectively. Trifloxystrobin 11% + tebuconazole 75% (T2) at 0.4 g/l was also comparable to T1, registering disease incidence of 82% and 75% in 2020 and 2021, respectively. Whereas, in the Propiconazole 11.4% @ 1.0ml/l treatment (Farmers method), the incidence in 2020 was only 67.0% and the incidence in 2021 was 65.0%. Azoxystrobin 11% + Tebuconazole 18.3% treated plots produced higher yields compared to farmers' practices. Although the chemical is more expensive than what farmers typically use, disease incidence is significantly reduced after just one spray and results in higher product yields. The earlier scientific studies conducted by Bag et.al., 2016; Sivakumar et.al., 2019; Madhavi et al., 2021; Bhuvaneswari and Raju, 2012 was also stated that Azoxystrobin 11% + Tebuconazole 18.3% was effective in decreasing the sheath blight incidence in Paddy.

Key words: Azoxystrobin + Tebuconazole Rice, Sheath blight, Strobilurins, Trifloxystrobin + Tebuconazole

INTRODUCTION

Rice (Oryza sativa L.) is one of the most important cereals in the world, consumed by 50% of the world's population (Luo Y *et al*., 1998). In India, it is planted on 53.2 million hectares with a total production of 99.8 million tonnes. The crop is also a major food crop grown in Srikakulam district of Andhra Pradesh with 200,000 hectares. This rice crop is affected by various biological factors (i.e. pests and diseases) which lead to a decrease in grain quality and

yield. Among various diseases, sheath blight (ShB), caused by Teleomorph : *Thanatephorus* cucumeris (Frank) Donk, is a devastating disease worldwide, causing significant yield loss and quality decline. The disease was once considered a condition purely of scientific curiosity. However, it is now taking on greater significance and importance in various rice-growing countries. It now ranks second among economic losses in tropical and temperate regions and has become an important disease of great concern (Gangopadhyay and Chakraborti, 1982; Manibhusanrao, 1995). The disease develops rapidly during flowering, when rice leaves are densest, creating a microclimate conducive to the growth and spread of the pathogen, especially when relative humidity is high. Under field conditions, fungicide-based management was most effective in most cases (Kandhari and Gupta 2003, Bhuvaneswari and Raju 2012 and Kumar *et al*., 2013). Despite the chemical control of the disease by farmers, under field conditions the disease causes severe early crop losses with yield losses of up to 25-30% each year. Many farmers in the region still routinely use the old common chemicals two or three times, even though there are several new combinations of effective chemicals on the market. Recently, Azoxystrobin 18.2% + Tebuconazole 18.3% SC, Kresoxim Methyl 40% + Hexaconazole 8%, Azoxystrobin 18.2% + Difenoconazole 11.4% SC, Trifloxystrobin 25% + Tebuconazole 50% 75WG and Kasugamycin 5% + Copper oxy chloride 45% have been listed to show the control of sheath blight under field conditions (Kumar and Veerabhraswamy 2014 and Pramesh *et al*. 2016). Continued use of the same group of fungicides with the same mode of action can lead to resistant strains of the same fungus, so there is a need to find new molecules with different modes of action. In this case, KVK Srikakulam carried out the onfarm trial (OFT) for the management of Sheath blight in paddy fields using new molecules Azoxystrobin 11% + Tebuconazole 18.3% to educate farmers about new effective chemicals in 2020 and 2021 and provide clarification to farmers.

MATERIAL AND METHODS

This trial was conducted at five selected locations in Srikakulam district of Andhra Pradesh, India with the following treatments.

List 1 : Treatments details

Treatments	Particulars	No of locations
T-1	Spraying of Azoxystrobin 11% + Tebuconazole 18.3% 1.5ml/l at tillering stage OR after disease initiation	05
T-2	Spraying of Trifloxystrobin + Tebuconazole 75WG @ 0.4g/l at tillering stage OR after disease initiation	05
T-3	Control or Farmers practice (Spraying of Propiconazole 25 EC @ 1 ml/l after disease initiation)	05

Plots of 0.2 ha at each location were sprayed as soon as the disease was observed. Applied a single spray during the vegetative/ tillering stage of the crop to control sheath blight.

Observations recorded on the percentage incidence of the disease and the yield (Kg/ha) in the treated plots. Record the disease incidence (DI) using the following formula

Disease incidence = (Number of infected tillers / Total number of tillers) x 100

RESULTS AND DISCUSSIONS

The results showed that the new chemical Azoxystrobin 11% + Tebuconazole 18.3% (T1) at 1.5ml/l was effective in reducing the incidence of Sheath blight in paddy. The disease incidence percentages recorded in 2020 and 2021 are 4.4 and 6.1 respectively. After spraying with Azoxystrobin 11% + Tebuconazole 18.3% in the tillering stage, the disease incidence decreased to 88% in 2020-21 and 81% in 2021-22 (Table 1). Trifloxystrobin 11%+ Tebuconazole 75% (T2) 0.4 g/l, another strobilurin compound, with incidences of 5.8% and 7.5% in 2020 and 2021, respectively, was on par with the T1. While under usual agricultural practices (propiconazole 11.4% @ 1.0 ml/l) (T3), recorded the disease incidence of 10.6% during 2020 and 11.2 % during 2021. Only 69% and 65% disease reductions were observed in 2020 and 2021 after one spray in T3. Azoxystrobin 120 + Tebuconazole 240 SC @ 830 ml/ha had the lowest incidence of disease of 11.34%, 11.04% and 10.95% after the first, second and third sprays respectively (Sivakumar *et al.,* 2019). Among the strobilurins, the fungicides azoxystrobin are widely used due to their effectiveness against sheath blight

pathogen (Groth and Bond, 2006). The fungicide combination azoxystrobin 18.2% + difenconazole 11.4% SC (strobilurin + triazole) was more effective against sheath blight than the other individual fungicides reported by Bhuvaneswari and Raju, 2012. Pramesh et al. (2017) also showed that the chemical Azoxystrobin 11% + Tebuconazole 18.3% w/w at 1000 ml/ha had the lowest percentage incidence of rice head blight. Current research results have also confirmed the superior efficacy of azoxystrobin 11% + tebuconazole 18.3%.

The highest yields were also recorded in the T1 (Azoxystrobin 11% + Tebuconazole 18.3%) 5670, 5890 kg/ha during 2020-21 and 2021-22, respectively, compared to the farmer's practice (5164 and 5210 kg/ha during 2020 and 2021, respectively) (Table 2). Farmers also expressed satisfaction that the new molecule is reducing disease. Although the price of pesticides was higher than that of conventional chemicals used in farms, the incidence of disease decreased significantly after one spray, and production increased.

Application of fungicides at various crop stages has been reported to increase yield by reducing disease burden (Pramesh *et al.*, 2016; Siebold *et al.,* 2004; Naik *et al.,* 2012). Previous scientific studies by Bag *et al.,* 2016; Sivakumar *et al.,* 2019; also reported that 11% azoxystrobin + 18.3% tebuconazole were effective in reducing the incidence of bursts and increasing rice yield. Amarajyothi and Chinnam naidu, 2020 also report that preventive measures are more effective in reducing the incidence of rice blast and sheath blight.

Table 1: Efficacy of Azoxystrobin 11% + Tebuconazole 18.3% on the management of Sheath blight incidence in paddy

Treatments	Dosage	2020-21			2021-22		
		% DI Pre-Spraying	DI After one spray	% Decrease in	% DI Pre-Spraying	% DI After one	% Decrease in

				disease		spray	disease
T1: Azoxystrobin 11% + Tebuconazole 18.3%	1.5ml/l	38	4.4	88.2	32	6.1	81.0
T2: Trifloxystrobin + Tebuconazole 75WG	0.4g/l	35	5.8	82.7	32	7.5	75.0
T3: Control/ Farmers practice - Propiconazole 25 EC	1ml/l	38	10.6	69.2	32	11.2	65.0
Sd (p=0.05)		-	1.79			1.38	

Table 2: Sheath blight incidence, yield and Economic particulars in paddy during 2020-21 and 2021-22

Treatments	2020-21				2021-22			
	% DI	% Decrease over control	Yield (Kg/ha)	BC Ratio	% DI	% Decrease over control	Yield (Kg/ha)	BC Ratio
T1: Azoxystrobin 11% + Tebuconazole 18.3%	4.4	58.4	5670	1: 2.25	6.1	45.5	5890	1:2.29
T2: Trifloxystrobin + Tebuconazole 75WG	5.8	45.8	5366	1:2.18	7.5	36.0	5560	1:2.20
T3: Control/ Farmers practice - Propiconazole 25 EC	10.6	-	5164	1:1.98	11.2	-	5210	1:2.09

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