ISSN : 2348-8069 Int.J.Adv. Res.Biol.Sci.2014; 1(5):15-18

International Journal of Advanced Research in Biological Sciences

www.ijarbs.com

Research Article

Relationship of temperature with leaf folder infestation on varieties of Rice

Muhammad Farooq[1], Faqir Ahmad[1], Muhammad Latif[1], Allah Rakha Sajjid[1], Ghulam Mustafa Shad[1], Masood Ahmad[1], Muzzammil Hussain[2] Mazher Farid Iqbal[3] and Sadaqat Munir[4]

[1]Pest Warning & Quality Control of Pesticides, Punjab
[2]Adaptive Research Farm, Gujranwala
[3]Adaptive Research Station, Sialkot
[4]M. Phil Student University of Sargodha-Sargodha
*Corresponding author e-mail: *adagujranwala@gmail.com*

Abstract

The study was conducted to evaluate the relationship of temperature with leaf folder infestation on different varieties of transplanted rice viz. Basmati super, Basmati 515, PS-2, PK-386, Super fine & Supri of rice at Pest Warning & Quality Control of Pesticides, Gujranwala during Kharif 2010-2012 with RCBD. Maximum leaf folder attack was recorded in PK-386 (53.19%) followed by S. fine (47.37%); Supri (42.59%); B. 515 (41.18%); PS-2 (38.46%) and B. Super (37.74%) with temperature (maxi-mini) (31.29-21.85^{o}C) during 2010. Similarly maximum attack was recorded by PK386 (52.10%) followed by S. fine (46.45%); Supri (40.00%); B. 515 (40.59%); PS-2 (35.60%) & B. Super (31.67%) at temperature (32.21-22.99^{o}C) during 2011.However at temperature (30.93-22.45^{o}C) PK386 showed susceptibility (56.43%) against leaf folder attack followed by S. fine (49.34%); Supri (47.14%); B. 515 (45.83%); PS-2 (44.59%) and B. super (42.13%) during 2012. At the end it was concluded that PK-386; S. fine; B. 515 and Supri are susceptible to leaf folder infestation. However the farmers are advised to transplant S. basmati and PS-2 to overcome problem of leaf folder attack.

Keywords: Temperature; Leaf Folder; Basmati Super; Basmati 515; PS-2; PK386; Super Fine; Supri

Introduction

Rice (*Oryza sativa* L.) is the most widely consumed food crop in the world. The cultivated area of basmati rice and coarse rice in Pakistan was 1414, 517.8 (000) hectare with annual production of 2475.4, 1237.6 (000) tons respectively (Anonymous, 2011). In past rice leaf folder (*Cnaphlocrosis madenalis*) was considered a minor & sporadic pest Rice in Asia. Now it has attained the status of major pest during the last few years (Shah *et al*., 2008). In Pakistan this pest has been multiplied anonymously, caused severe infestation during 1994, 2006 and 2012. Up to 25% attack on leaf was recorded which reducing yield of rice up to 30%, however up to 50% infestation was recorded in some local places (Salim *et al.,* 1991). Change in environmental conditions, multiple cropping pattern and application of high dosage of urea ultimately effect on severity of attack (Khan *et al.,* 1989). The young larvae feed on leaves of rice by scratching it and fold the leaf longitudinally with self secreted sticky substance. The scratched leaves become membranous, turn whitish and finally drying up. Single larvae can damage number of leaves, which retarded photosynthesis; plant growth resulting huge yield loss. Therefore crop success depended upon Integrated Pest Management (IPM).

On the other hand pesticides are important in modern farming in ordered to feed world's growing population but quality is equally important as quantity. Pesticides are man-made chemicals that control insects, pests, rodents and other infestations (Iqbal *et al*., 2009). Thus careful use of pesticides improves our diet by decreasing the cost and quality of product; however this can only be done through IPM. IPM can be provided tremendous benefits to the growers, in Bangladesh farmers practicing IPM & achieved 13.5% higher yield by reducing expenditure upto 75% (Kogan, 1998). In Pakistan loss occurred by different pests is upto 15120 million rupees; which works out 18.60% of total loss. IPM prevents unacceptable level of pest damage by using the most economical control that entailed the least possible risk to people, property and the environment (Kogan, 1998). Residues of pesticides were found in continuous food supply along with different vegetables (Salwa *et al*., 1999; Tahir *et al*., 2001; Dogheim *et al*., 2002 and Iqbal, *et al*., 2007). Haphazard use of pesticides caused unlimited threats for human beings and naturally growing population (Iqbal *et al*., 2007). However spraying of botanical extracts for controlling different insects is needed for developing country like Pakistan (Iqbal *et al*., 2011). Therefore the study has been planned to evaluate six different varieties of rice srown by transplanting method at different areas to check the attack (%) of rice leaf folder with relation to temperature at Pest Warning & Quality Control of Pesticides, Gujranwala.

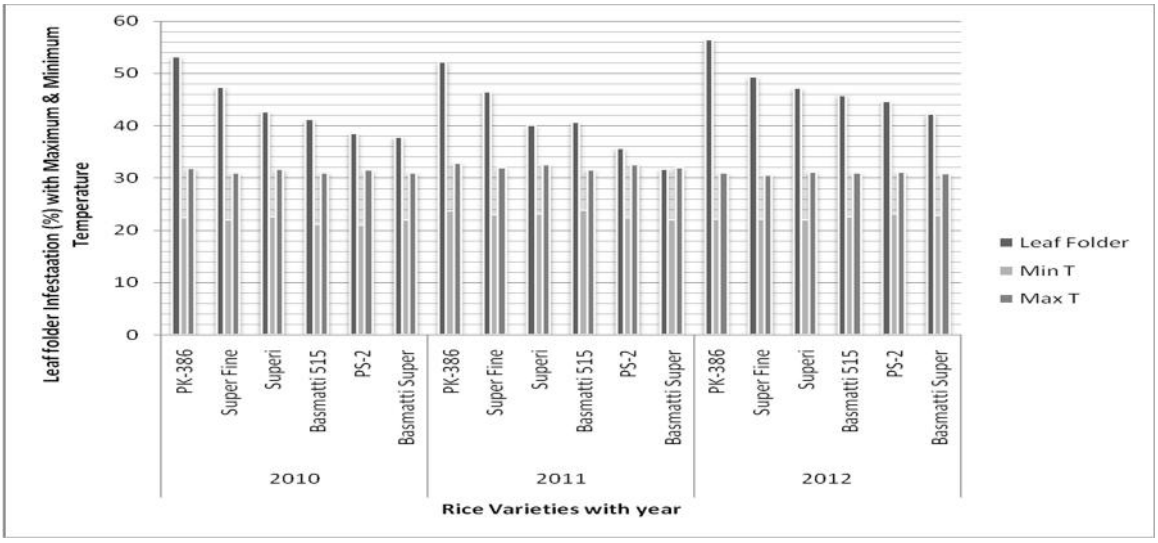
Materials and Methods

The study was conducted to evaluate the relationship of temperature with leaf folder infestation on different varieties of rice viz. Basmati super, Basmati 515, PS-2, PK-386, Super fine & Supri of rice at Pest Warning & Quality Control of Pesticides, Gujranwala during Kharif 2010-2012. The experiment was laid out with Randomized Complete Block Design with three replications with net plot size of 40x60 ft^2 area. Recommended dose of DAP & SOP was broadcasted after well puddled soil just before planking. The rice nursery was transplanted manually @ 10 merlasha^{-1} keeping Plant to plant & line to line distance upto 9 inches . Orthosulfamuran was broadcasted @ 150gha^{-1} with shaker bottle three days after transplanting (DAT) keeping water level 03 inches upto 20 days. Cheletaed Zinc Sulphate 05% was applied @ 5kg ha^{-1} 25 DAT; Urea was broadcasted manually in the field @ 185kgha^{-1} in two splits 35 and 75 DAT. No insecticide was broadcasted and even sprayed in the field throughout the growing season. The field was monitored for leaf folder infestation on daily basis from 1st August to 31st October every year. All the other agronomic and plant protection measures were kept constant in growing season to avoid any biasness. Maximum & Minimum temperature (^{o}C) was recorded daily and then taken average of respective year. The damaged leaves were counted and % infestation was calculated (Shah *et al*., 2008).

Results and Discussion

Maximum leaf folder attack was recorded in PK-386 (53.19%) followed by S. fine (47.37%); Supri (42.59%); B. 515 (41.18%); PS-2 (38.46%) and B. Super (37.74%) with temperature (maxi-mini) (31.29-21.85^{o}C) during 2010. Similarly maximum attack was recorded by PK386 (52.10%) followed by S. fine (46.45%); Supri (40.00%); B. 515 (40.59%); PS-2 (35.60%) & B. Super (31.67%) at temperature (32.21-22.99^{o}C) during 2011.However at temperature (30.93-22.45^{o}C) PK386 showed susceptibility (56.43%) against leaf folder attack followed by S. fine (49.34%); Supri (47.14%); B. 515 (45.83%); PS-2 (44.59%) and B. super (42.13%) during 2012 (Fig-1). Favorable environmental conditions were helped in flare up of leaf folder population. At 35 ^{o}C the attack of rice leaf folder was decreased drastically. These results were in accordance to (Karuppaiach *et al*., 2012) reported that survival of leaf folder was greatly affected at 35 ^{o}C. Adult emerges from pupae reared at 35 ^{o}C were unable to lay eggs. The upper temperature threshold for survival of leaf folder was 30-35 ^{o}C (Heony *et al*., 1995). However similar trend of rice leaf folder infestation was recorded. (Khan *et al*., 1989; Rashid *et al*., 1994 and Anuj *et al*., 1999) who studied in theri experiment that low larval population was recorded in first week of September & high in end of October.

Figure 1. Relationship of temperature with leaf folder infestation on varieties of rice



Conclusion

Although all the varieties showed resistance against leaf folder infestation to some extant however PK-386; S. fine; B. 515 and Supri are susceptible. Therefore the farmers are advised to transplant *S. basmati* and PS-2 to overcome problem of leaf folder infestation.

References

Anonymous. 2011. Economic Survey of Pakistan. Govt. of the Pakistan, Finance Division, Economic Advisors Wing, Islamabad-Pakistan.

Anuj, B., Saxena, P. and Bhatnagar, A. 1999. Environmental Co-relation of population buildup of rice pests through light trap catches. Oryza. 36:241-5.

Dogheim, S.M., Marasafy, M. A. E., Salama, Y. E., Gadalla, A. S., and Nabil, M. Y. 2002. Monitoring of pesticide residues in Egyptian fruits and vegetables. Food Addit. Cont. 19: 1015-1027.

Heong, K. L., Song, Y. H., Pimsamarn, S., Zhang, R., and Bae, S. D. 1995. Global Warming & rice arthropod Communities. In: Climate Change and rice. Sprin. Publi. Berlin pp: 327-335.

Iqbal, M. F., Maqbool, U., Perveez, I., Farooq, M., and Asi, M. R. 2009. Monitoring of insecticide residues in brinjal collected from market of Noshera Virkan, Pakistan. The J. Anim. Plant Sci. 19(2):90-93.

Iqbal, M. F, Kahloon, M. H., Nawaz, M. R., and Javaid, M. I. 2011. Effectiveness of some botanical extracts on wheat aphids. The J. Anim. Plant Sci. 21(1):14-115.

Iqbal, M. F., Maqbool, U., Asi, M. R., and Aslam, S. 2007. Determination of Pesticide Residues in Brinjal Fruit at Supervised Trial. The J. Anim. Plant Sci. 17(1-2):21-23.

Karuppaiah, V., and Sujayanad, G.K. 2012. Impact of climate change on population dynamics of insect pests. World J. Agri. Sci. 8(3):240-246.

Khan, Z. R., Reuda, B.P., and Caballero, P. 1989. Behavioral and Physiological response of rice leaf folder (*C. madinalis*) to selected wild rice. Ento. Exp. Appli. 52:7-13.

Khan, M. R., Ahmad, M., and Ahmad, S. 1989. Some studies on biology, chemical control and varietal preferences of rice leaf folder, (*C. madenalis*) . Pak. J. Agri. Sci. 26:253-63.

Kogan, M. 1998. Integrated Pest Management. Historical perspectives and contemporary developments. Ann. Rev. Ent. 43: 243-270.

Rashid, A.1994. Comparative efficacy of neem oil and some insecticides for the control of insect pest complex of rice. M. Sc. Thesis, Univ. of Agri. Faisalabad, Pakistan.

Shah, S., Ali, M., Rehman, U. H., Rehman, A., Abbasi, F. M., Khalil, I. H., and Ali, A. 2008. Characterization of wild rice species in response to leaf folder (*C. madenalis*). Sarh. J. Agri. 24(1):69-74.

Salim, M., Rehman, A., and Ramzan, M. 1991. Leaf folder (*C. madenalis*) outbreaks in Punjab, Pakistan. IRRN. 16(1):22.

Salwa, M., Dogheim, A., Gad, A. S., and Ashraf, M. E. M. 1999. Monitoring pesticide residues in Egyptian fruit and vegetables. J. Offic. Asso. Analyt. Chem. 82 (4): 948-955.

Tahir, S., Anwar, T., Ahmad, I., Aziz, S., Mohammad, A., and Ahad, K.2001. Determination of pesticide residues in fruits and vegetables in Islamabad market. Eco-toxicology Institute, NARC Islamabad-Pakistan. J. Env. Bio. 22(1):71-74.