

Success Story

Effective Management of White Grub in Sugarcane by biological means

Situation Analysis:

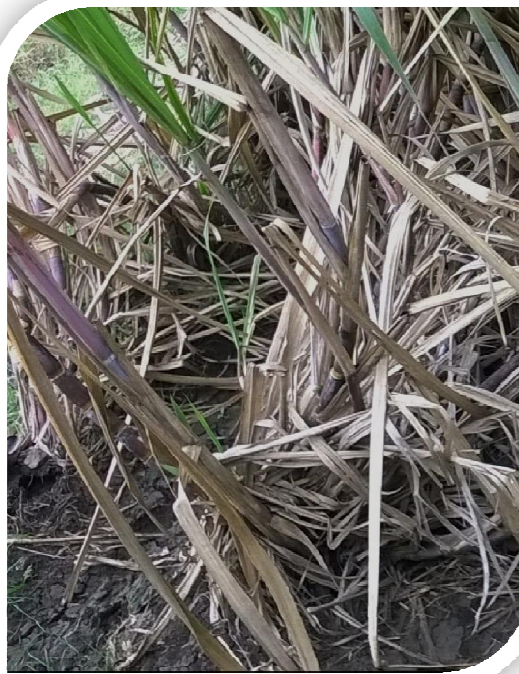
White grub is a polyphagous pest of national importance and significance as it adversely affects the economic status of farmers. White grubs have become a challenging subject for the farmer of Kolhapur district. No crop is completely free from these white grub infestation, however, sugarcane crop is most adversely infested by this notorious pest and caused huge economic losses. The rainy season provides favourable conditions for white grub attack. It has threatened the entire Kharif crop production in the district.

Holotrichia serrata is important species of white grub that damaging the sugarcane crop seriously, especially in last 8-10 years reduction in yield in the district of Kolhapur. White grubs (melolonthid larvae) feed underground on the roots of sugarcane plants, while the adult beetles feed on the leaves of neem, babhul, Arjun and other selected trees during nights. In sugarcane, the grubs feed on the roots underground continuously, as a result the attached plant becomes pale, gives wilted appearance and finally dries which can be easily pulled out. In heavy infestation the plant collapse. The heavy losses in yield and sugar recovery are noticed to the toll of 20 to 40 and 0.5 to 1% respectively.

Before 5 to 6 years, during kharif, due to erratic and scarce rains, the white grub populations were at its peak, and caused severe damage to canes to collapse and die even at maturity stage. The millable canes so damaged by white grub are numerous in number and are not preferred by sugar factories. This resulted into uneasiness of farmers and ultimately cooperative sugar factories.



Entity: Grub, feeds on underground roots



Loss: Drying, stunting and dyeing of cane

Technology, Implementation and Support:



Preparation of drenching solution



Drenching of roots by solution



Dr Dattatri, Principal Scientist, visited demonstration plot and interacted with farmers

The remedies suggested by research institutions at that time are integrated but the farmers have adopted use of chemical pesticides for the control of white grub which is easier as they felt. Considering the threats of application of chemical pesticides, Krishi Vigyan Kendra, Talsande has intervened at right time in a right way to convince the farmers to use the biological means which ecofriendly for the control of white grub.

Considering the Front Line Demonstration is the most favorable tool for acceptance of newer technologies by the farmers, it was decided to demonstrate the technology on farmer's field. The programme was designed continuously for three years to demonstrate the technology for the year 2014-15, 2015-16 and 2016-17 by Krishi Vigyan Kendra, Talsande.

The inputs selected were biologicals, *Metarhizium anisopliae* (1% Powder) and *Beauveria bassiana* (1% powder) both to study comparative efficacy against the white grub pest in sugarcane.

The critical issue was mode and method of application of powders of biological pesticides at right time and at right place i.e. in the root zone of sugarcane crop to kill the entity where it prevails. The issue was resolved with repeated discussions with progressive farmers, university, scientists and field visits, training programme. It has been decided and agreed by all to prepare solution of powders of *Metarhizium anisopliae* and *Beauveria bassiana*, separately at the rate of 500 gm powder into 100 lit of water. Application of solution in the furrows at the base of crop, before earthing up and on the ridges at the base of crop after earthing up depending upon crop situation. Rainy season is preferred.

Uptake, Spread and benefit:

The observations of per cent damage to canes and yield in MT/ha were recorded. The per cent damaged to canes in the years 2016-17, 2015-16 and 2014-15 in demonstrations was 3%, 7%, and 3% where as in local check 21%, 23% and 18% respectively. The Highest per cent increase in yield was noticed in the year 2016-17 i.e. 26.11% where *Metarhizium anisopliae*, the treatment as against it was lowest i.e. 21.70 in 2014-15 where *M. anisopliae* and *B. bassiana* (1:1 proportion) the treatments. The benefit cost ratio tallies with the above per cent increase in the yield with 2.38 benefit cost ratio in the year 2016.17 in the *M. anisopliae* treatment plots as against 1.67 benefit cost ratio in the year 2014-15 in the *M. anisopliae* + *B. bassiana* (1:1 proportion) treatments.

From the data it has been revealed that, application of *Metarhizium anisopliae* 1% powder at the rate of 500 gm in 100 lit water dilution for solution is found to be effective when applied the solution on ridges at the base of sugarcane plant after earthing up and in furrows at the base of plant before earthing up in rainy kharif season.

Results of biological pesticides against white grub in sugarcane with economic studies.

Year	Bio pesticides applied and quantity/ha	Area in ha	Yield MT/ha		%	% Incidence of grub		Economics of demonstration Rs/ha			
			Demo	Check		Demo	Check	Gross Cost	Gross Return	Net Return	BCR
2016-17	<i>Metarhizium anisopliae</i> 20 Kg	07.85	130.75	94.71	26.11	03	21	120467	287650	167183	2.38
2015-16	<i>Metarhizium anisopliae</i> 15 Kg + <i>Beauveria bassiana</i> 5 Kg (3:1 proportion)	06.25	122.00	87.00	24.95	07	23	118620	244000	125980	2.06
2014-15	<i>Metarhizium anisopliae</i> 10 Kg + <i>Beauveria bassiana</i> 10 Kg (1:1 proportion)	11.70	124.50	96.50	21.70	03	18	148310	249000	100690	1.67

As a result of successful conduct of field days, group meetings, Kisan goshties, farmer seminar, Kisan melas, exhibitions, newspaper coverage, popular articles and radio programmes etc. the technology for 'effective management of white grub in sugarcane by biological means' is spread up rapidly to the 12300 farmers covering sugarcane area of 7000 ha., approximately, benefitted and will continue to benefit in coming years.

Estimated Environmental Impact:

The biological pesticide is eco-friendly tool for management of white grub pest in sugarcane crop, maintaining good health of soil, good quality produce with better recovery and minimal chemicals residue and increased yield. Risk of handling of hazardous pesticides is avoided. Environmental and soil pollution is minimized.

Estimated Social Impact:

The economic status is improved which ultimately resulted into involvement of farmers in social decisions and cooperative local body structures.

