

Management of ant and termite in groundnut

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Abstract: Management of ant and termite in groundnut crop was studied at the Regional Agricultural Research station, Bangladesh Agricultural Research Institute (BARI), Rahmatpur, Barisal during rabi season of 2007-2008 and 2008-2009 to find out the most effective management technique of groundnut crop by these pests. Seeds of groundnut were sown on November 30, 2007 and 2008 in 10m X 5m size plots in randomized complete block design (RCBD) with three replications. The ant and termite infested the groundnut crop after sowing in the soil and continued up to maturity. Application of Kerosine oil 5ml/kg of kernel before sowing gave the highest infestation reduction (26.80%) over the untreated plot and also calculated the highest BCR (5.22) followed by Sevin 85 WP @ 2g/kg of kernel (4.95).

Key words: Management, Ant, Termite, Groundnut

Introduction

Groundnut (*Arachis hypogaea* L.) is the third most important legume oilseed crop in Bangladesh (Anon.2008.) which is grown 27073 ha with a production of 34240 metric tons in 2002-2003 (BBS, 2005). Its seed contain 48-50% oil and 22-29% protein, Its is used as edible oil to make cake, biscuit and others confectionary purpose. Recently the area of groundnut is being decreased due to the competition with rabi crops like wheat, potato, boro rice and mustard (Biswas *et al.*, 1997). Moreover, most of the char areas of Bangladesh become inundated in the kharif season which causes decline of groundnut area. In kharif season, only some high lands are used for groundnut cultivation. Groundnut (*Arachis hypogaea* L) is the third important oilseed crop in Bangladesh (Anon. 2004). Ant (*Camponotus spp.*) and termite (*Microtermes sp.* & *Odontermes sp.*) are the important insect pests of groundnut. After sowing ant and termite damage the seeds of groundnut in the soil by boring and eating and taken away from the original sowing place. As a result germination is hampered and infested seeds become rotten. The termite damages the seeds by boring the underground nuts and cutting the roots and eating the germinating roots and shoots resulting rot of the seeds and plants (Kaul and Das, 1986). The rate of damage by ants and termites in groundnut and there effective management are of great importance to increase groundnut production in this country. Indiscriminate use of chemical insecticide causes resistance of the pest, phytotoxicity, destruction of beneficial organisms, human health hazard and environmental pollution. So it is necessary to find ecologically safe methods for pest control. Petroleum oils like kerosine used as pesticide specially the repellent action on ant and termite and other soil insect (Rahman, 2007). No information is available about management of ant and termite pests of groundnut in this country. Therefore, the study was undertaken to record the extent of infestation and to find out the effective management technique against these pests.

Materials and Methods

The experiment was conducted in the field of the Oilseed Research Centre, Regional Agricultural Research station, Bangladesh Agricultural Research Institute (BARI), Rahmatpur, Barisal during two rabi season of 2007-2008 and 2008-2009. The experiment was laid out in a randomized complete block design (RCBD) with three replications. The unit plot size was 6m X 5m. Fertilizers were applied at 25-160-85-300-5-10 kg/ha of urea, triple super phosphate, muriate of potash, gypsum, zinc sulphate and borax respectively, as recommended for Bangladesh (Anon, 2004). One half amount of urea and full dose of all other fertilizers were incorporated into the soil at the time of final land preparation. The remaining urea was top dressed in two equal installments at 35 and 65 days after sowing. During land preparation, cowdung was applied at 10 ton/ha. Seeds of groundnut variety BARI chinabadam-6 were sown on December 21, 2007 and 2008. The spacing maintained for groundnut was 30 cm row to row and 10 cm seed to seed distances. Intercultural operations, such as irrigation was given twice, weeding, mulching and earthing up were done as and when necessary. Six treatments namely, Mixed with kerosine 5ml/kg of kernel, Mixed with sevin 80WP 2g/kg, Neem oil 5ml/kgseed, Application of neem oil cake 60 kg/ha, Spraying of dursban 20EC @ 2ml/l and Untreated control were tested against ant and termite of groundnut under field condition. Before sowing, seeds were mixed properly with kerosine, sevin and neem oil, individually. Dursban 20 EC was sprayed on the seeds after was sprayed on the seeds after sown in the soil. Before sowing seeds were counted and after germination plant population were counted and final plant population were also counted at maturity stage of the crop. Percent seed/plant damage was recorded by counting seeds and plant population in each treatments. The crop was harvested on 4th week of May, 2008, 2009. Yield data of different treatments were recorded and analyzed in the computer for Randomized Complete Block Design (RCBD) and analysis of variance (ANOVA) with Duncan's Multiple Range Test (DMRT)

(Gomez and Gomez, 1984). Benefit Cost Ratios (BCR) of the treatments were also calculated for final conclusion.

Results and Discussion

Ant and termite infestation in groundnut was started in December and continued up to June i.e. sowing, germination, seedling and maturity stages of the crop. Severe infestation occurred during January at the germination and early vegetative stages of the crop. Fifty groundnut kernel was sown in one row (3m) of the plots in each of the treatments. But number of plant population stands ranged from 30-41 in all the treatments. The highest plant population (41/row) recorded in the kerosine oil treated plot followed by sevin treated plots (40/row) and neem oil treated plots (39/row) (Table1). About 30% of the sown seeds were damaged by ant and termite or failure

to germination due to insect pests and diseases. The crop can be saved about 26.80% groundnut seeds adopting proper management techniques (application of kerosine oil @ 5ml/kg of kernel before sowing of seeds) The highest seed yield (1805.33 kg/ha) was obtained from sevin treated plot followed by kerosine oil treated plot (1775.67 kg/ha) (Figure1) with 9.42% and 7.90% increased in yield over the untreated (Table2). The highest BCR (5.22) was calculated in kerosine oil treated plot followed by sevin treated plot (4.95) and neem oil treated plots (4.84). Dursban sprayed plot gave the lowest BCR (1.67) due to higher management cost (1045Tk/ha) (Table 2 and Fig. 1). Rahman (2007) reported that petroleum oils like kerosine used as pesticide specially the repellent action on ant and termite and other soil insects. Singh (1996) showed that neem oilcake was effective for the management of termite and ant in groundnut crop in India.

Table 1. Efficacy of Kerosine, neem oil and insecticides against ant and termite in groundnut

| Treatment | No. of seed sown/row (3m) | No. of plant/row (3m) | Increase plant population over untreated (%) | Yield (Kg/ha) |
|-------------------|---------------------------|-----------------------|--|---------------|
| Kerosine | 50 | 41.33 | 26.8 | 1775.67ab |
| Sevin | 50 | 40.33 | 24.78 | 1805.33a |
| Neem oil | 50 | 39.33 | 22.88 | 1726.56b |
| Neem oil cake | 50 | 35.33 | 14.29 | 1685.77ab |
| Dursban | 50 | 33.67 | 10.00 | 1705.33c |
| Untreated control | 50 | 30.33 | - | 1635.33d |

Mean followed by the same letters in a column do not differ significantly at 5% level by DMRT.

Table 2. Economics of different treatments applied against ant and termite in groundnut

| Treatment | Yield (kg/ha) | Increased yield over untreated (kg/ha) | Increase in yield over untreated (%) | Cost of insecticides & spray (kg/ha) | Addition. Income (Tk/ha) | Net income (TK./ha) | BCR |
|-------------------|---------------|--|--------------------------------------|--------------------------------------|--------------------------|---------------------|------|
| Kerosine | 1775.67ab | 140.34 | 7.90 | 675 | 5600.00 | 3525.00 | 5.22 |
| Sevin | 1805.33a | 170.00 | 9.42 | 1075 | 6400.00 | 5325.00 | 4.95 |
| Neem oil | 1726.56b | 91.23 | 5.28 | 625 | 3649.90 | 3024.90 | 4.48 |
| Neem oil cake | 1685.77ab | 50.44 | 3.00 | 775 | 2017.20 | 1242.20 | 1.60 |
| Dursban | 1705.33c | 70.00 | 4.10 | 1045 | 2800.00 | 1755.00 | 1.67 |
| Untreated control | 1635.33d | - | - | - | - | - | - |

Mean followed by the same letters in a column do not differ significantly at 5% level by DMRT

Price of groundnut seed =50Tk./kg, cost of neem oil=200 Tk./litre, Cost of kerosine oil= 40Tk./litre, cost of Dursban=800Tk./litre Cost of neem oil cake=50Tk./kg, Cost of Sevin=1Tk./kg.; Cost of labour/120 labour day, Three labours and 1litre of Dursban 20EC @ 2ml/l being required for 1hectare of crop field sprayed in one time. One machine spray volume= 10 litre required 200 sqm field spraying in one time. Other variable costs were same in all the treatments.

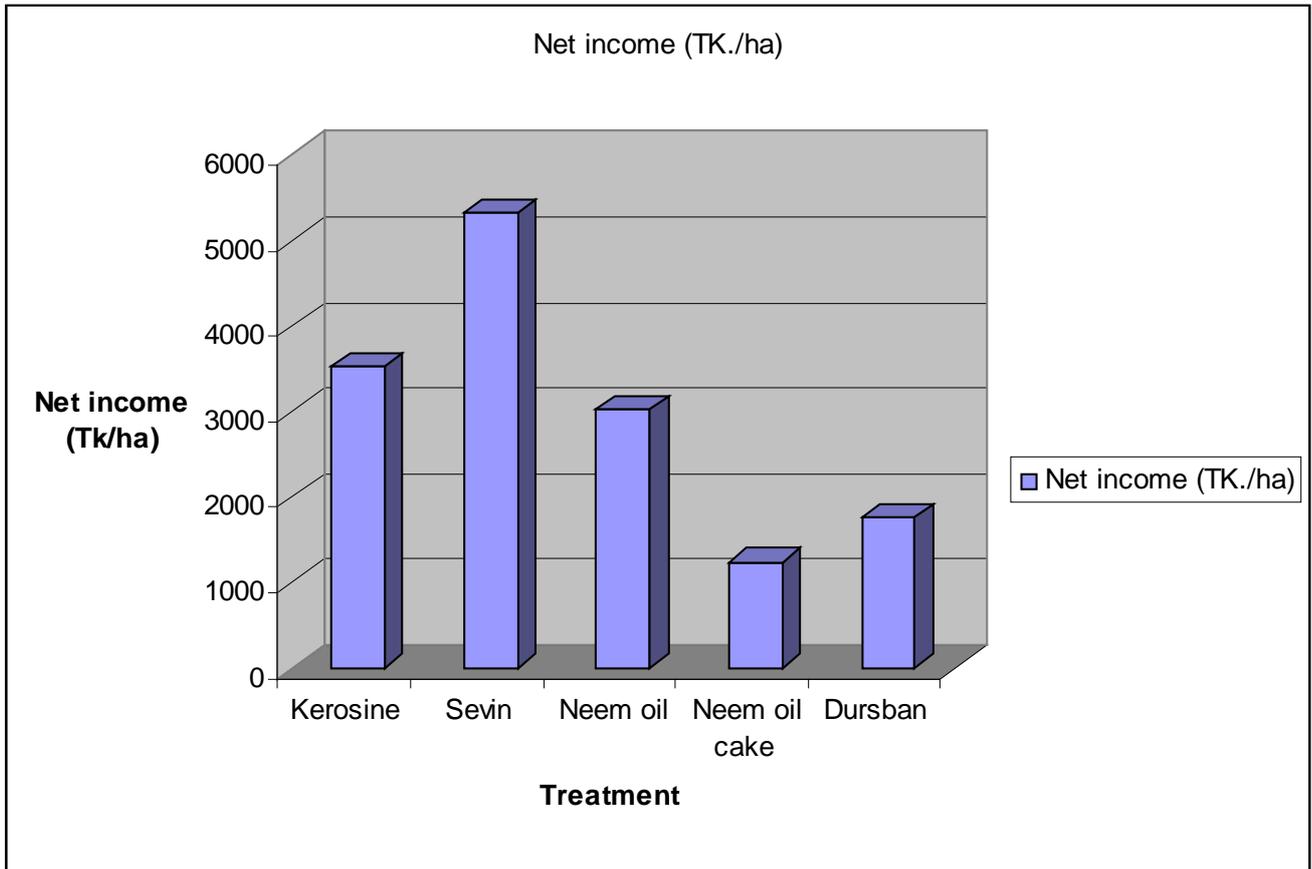


Fig. 1. Show the net return on economic analysis of different treatment

References

- Anonymous, 2004. Report on Groundnut Breeding. Annual Research Report (2003-04), Oilseed Research Centre, BARI, Gazipur.p.120.
- Anonymous, 2008. Annual Report 2007-08. Oil Seed Research Centre (ORC), BARI, Joydebpur, Gazipur.
- BBS (Bangladesh Bureau of Statistics), 2005. Statistical Year Book of Bangladesh, Sta. Div., Minis. Plan. Govt. People's Repub. Bangladesh, Dhaka.
- Gomez, K. A. and Gomez, A. A. 1984. Statistical procedures for Agricultural Research. Int. Rice Res. Inst., John Willey & Sons, NY.
- Kaul, A. K. and Das, M. L. 1986. Oilseeds in Bangladesh. Bangladesh Canada Agriculture Sector Team. Ministry of Agriculture, Govt. of the People's Republic of Bangladesh, Dhaka. pp.324.
- Rahman, M. M. 2007. Judicious use of pesticides for ensuring food safety proceedings: The Seventh Biennial conference of Bangladesh Entomological Society 29th December 2007. BARC Dhaka-p18-32.
- Singh, S.R. 1990. Insect Pests of Tropical Food Legumes. John Willey and Sons. New York.p451.