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Scaling Up of Termite Mounds Driller Technology in Selected Weredas of Kellam and West Wollega Zones of Oromia State, Ethiopia

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Abstract
Termites are small, pale soft bodied insect (order Isopteran) that lives in large colonies with several different castes, typically within a mound of cemented earth. Termites cause widespread damage to a great variety of crops in tropical Africa, are abundant and widely distributed throughout the regions of Ethiopia and pose threat to crops, forestry trees, range land, and domestic houses. So, for the termite situation to be adequately and summarily tackled there is a need to develop participatory involvement of farmers in all stages of technology generation, evaluation, and transfer. For this reason, very simple instrument called termite mound driller was developed and evaluated at Bako Agricultural Research Center on station and it showed effectiveness to minimize termite's damage to crops and natural vegetation's. a scaling up of termite mounds driller technology was conducted for three consecutive years in 2013/14, 2014/15 and 2015/16 during occurrence seasons in selected Woredas of Kellem and West wollega zones of Oromia regional state, Ethiopia. The objective of the study was to reduce termite colonies through scaling up of termite mound driller device which makes easier chemical application under/on the farmers' field in West and Kellam wollega Zones where termite is a problem on maize , to promote the use of technologies among farmers and improve their income level ,to create awareness of how to develop and transfer these technologies to the resource poor farmers of the area and also to strengthen linkage between farmers and concerned stakeholders to make this device easily accessible to resource poor farmers. A 360 mounds were poisoned in 253 farmers field in full span of the project span. Among the mounds poisoned only six mounds were regenerated a year later after its application. To poison the specified amount of termite mounds (360), 45 liters of chemicals were used in the three years duration of the project; a rate of 70 milliliter of chemical and 20 liter of water in combined form was applied to poison a single termite mound. Hence, Farmers are very satisfied with technology and the achievements provided. They evaluate the technology in relation to its effectiveness, time and energy saver, urgent interventions and participatory.
Keywords: Termite Mound Driller, and Diazinon (Ethiozinon)

Introduction

Termites are small, pale soft bodied insect (order Isopteran) that lives in large colonies with several different castes, typically within a mound of cemented earth. Termites are mainly found in the tropics and sub-tropics between 45°N and 45°S latitudes. These distribution areas cover over two-thirds of the landmass, involving some 100 countries with a total human population of over 300 million. Most of these countries are developing countries, over half of which have a gross national product (GNP) of less than USD 500 (Wood & Johnson 1986). In many of these distribution areas the pest species pose a serious threat to agricultural crops, forest seedlings, rangelands, and wooden structures.

Several species of termites have recorded as attacking groundnuts but the most important are the subterranean fungus growers (Johnson and Wood, 1980), losses are commonly expressed in terms of percentage plant mortality. For example, Sands (1960) recorded up to 30% of groundnut plants killed by microtermes in northern Nigeria and in northern India *Odontotermes obesus* Rambur is reported to have killed up to 50% of the plants (Kaushal and Deshpande, 1967).

Termites cause widespread damage to a great variety of crops in tropical Africa, are abundant and widely distributed throughout the regions of Ethiopia and pose threat to crops, forestry trees, rangeland, and domestic houses especially in west Wollega Zone particularly at Mendi, Nedjo, and Bojji Dirmajji districts (Abdurhaman, 1983; Abrahm, 1990) and Gawo Dalle districts (Temesgen,1996 unpublished). It poses a serious threat to maize production in many parts of Ethiopia viz. Wollega, Illubabor, Sidamo, Keffa, and Hararghe (Barnett et al., 1987 and Abraham, 1990). The problem is particularly prevalent in western part of the country where it has been well known for many years and caused up to 62% and 36% reduction in yields of hot pepper and maize respectively and it is said to exist from seedling to maturity of the crops (Temesgen, 1996 unpublished).

Research on termite problems has however limited to scattered individual research projects and some of the research works executed so far includes:

- Wood (1986) quantified losses due to termite's damage as 20% in maize, sorghum, groundnut, and 25%

in hot pepper and made several recommendations for short-term control, as well as development of long-term pest management practices.

- Sannae (1973) reported on increase in the termite problem in Manasibu district, which had resulted in migration of farmers from the affected areas to the low lands in search of new lands.
- Abraham (1990) conducted studies on various chemicals and non-chemical control methods involving fertilizer application at different rates, different seeding rates on maize.

But, even though these all and others are done to overcome the problem of termites, almost all of these alternative control methods above are not yet available to the farmers around West and Kellam Wollaga areas although they may provide opportunities for future management of the termite situation. So, for the termite situation to be adequately and summarily tackled there is a need to develop participatory involvement of farmers in all stages of technology generation, evaluation, and transfer. For this reason, very simple instrument called termite mound driller was developed and evaluated at Bako Agricultural Research Center on station and it showed effectiveness to minimize termite's damage to crops and natural vegetations. Therefore, the study was conducted with the Objectives of promoting the use of technologies among farmers and improve their income level, creating awareness of how to develop and transfer these technologies to the resource poor farmers of the area and strengthening linkage between farmers and concerned stakeholders to make this device easily accessible to resource poor farmers

Materials and Methods:

Methodology

The study was conducted in selected termite prone Woredas of West and Kellem Wollega Zones in collaboration with the concerned stakeholders on farmers field for three consecutive years during occurrence seasons. Three termite prone districts from west wollega zone (Manasibu, Nedjo and Bojji) and from kellem wollega zone (Gao-Dale, Dale Sadi and Lalo Kile) was selected respectively. From each district, a representatives and termite prone two peasant associations (PAs) was selected in collaboration with experts from respective agriculture and rural development offices. Then, in each PA ten farmers was selected to form 20 farmers per district and total of 60 farmers in the target zones. Farmer's selection was managed based on their interests, landownership and their interest to carry out the recommended chemicals and management practices. Gender balance and other important socioeconomic variables was also be taken into consideration to increase the farmers' influence in scaling up as well as increasing the research impacts.

The training was given for cooperatives members regarding the importance of termite mound driller and the chemical applied, and how to use it. Besides, experience sharing program (field day) was also arranged to supplement the theoretical training.

Materials used

Material used for this experiment are termite mound driller and Chemicals called diazinon (Ethiozinon) 60%EC on the areas affected by termite mound by the rate of 70 milliliter plus 20 liter water per mound and the chemical was drilled directly on cemented soil where the queen found.

Data management and statistical analysis

The type of data collected was farmers' assessment feedback on the released technologies (compatibility, affordability, complexity, and applicability) through regular interaction with farmers. Result and effects of this project data was also collected and analyzed.

During the implementation of this project various methods such as personal observation, individual and group interview and other relevant methods was used to collect and analyze the data. Simple descriptive statistics and qualitative analysis of farmers' assessment feedback was also used to analyze and interpret the data.

Moreover, field days and regular monitoring and evaluation of activities was also undertaken with the concerned stockholders.

Results and discussion

The project were implemented consecutively for three years in five selected districts of west and kellem wollega zones. Districts were selected based on the degree of seriousness of the termite impact. Accordingly, four districts were selected as intervention site in each year; in the first and second year of the project span the four districts selected for the intervention of this serious problem are Nedjo and Mendi from West wollega, where as Lalo kile and Dale sedi are from Kellem Wollega zones. Similarly, in the third year of the project or in this year, just as previous two years four districts were taken to tackle the problem of the farmers faced in agricultural production caused by termite, which in turn aggravates the living standards of the farmers to decline. Due to the seriousness of the problem is very high in Nedjo, Mendi and Lalo kile they are also taken as intervention site in this year; in addition, Dale wabera was added and the intervention is already implemented. 360 mounds were

poisoned in 253 farmers field in full span of the project span. Among the mounds poisoned only six mounds were regenerated a year later after its application. To poison the specified amount of termite mounds (360), 45 liters of chemicals were used in the three years

Year of intervention	Number of Beneficiary farmers		
	Male	Female	Subtotal
2013/14	109	16	125
2014/15	65	5	70
2015/16	53	5	58
Grand Total	227	26	**253**

The table below shows the number of beneficiary farmers in three years of the project duration with respect to their sex composition.

As it is described in the table above, 253 farmers were benefited from intervention in three years duration of the project; among them 227 were male and the remaining 26 were female.

The table below shows training for farmers/pastoralists, Development Agents(DAs)and Subject Matter Specialists (SMS) :

Training topic	*Duration*	*SMS*			*DAS*			*Farmers/pastoralists*			*Total*		
		M	*F*	*Sum*	*M*	*F*	*Sum*	*M*	*F*	*Sum*	*M*	*F*	*Grand total*
How to drill termite mound and chemical application	*2 days*	*0*	*0*	*0*	*6*	*0*	*6*	*40*	*5*	*45*	*46*	*5*	*51*

The table below shows field days made on activities (date, location, and number of participants)

How to drill termite mound and chemical application	Date	Location	Number of participants			
			farmers	extensions'	Others stake holder	total
	For two days	nedjo and mendi from west wollega, where as lalo kile, dale sedi and Dale Wabera are from kellem wollega zones.	65	24	132	221

The below shows Photo while the activity was under taken with farmers participation

Conclusions and Recommendation

The farmers evaluate the technology in relation to:-

a. Its effectiveness: The chemical applied were very effective in destroying the termite colonies; as a result almost no regenerated mounds after the application of the chemical using the termite mound driller.

b .Time and energy saver: As compared to the cultural method used by farmers the technology provided is applied within few minutes and with little energy.

C . Urgent interventions: Currently the problem caused by termite colonies on farmers agricultural practice is very serious. The production and productivity of the farmers field is decreased by the termite colonies action even though they using agricultural inputs. Hence, they feel and approved as the technology is provide for at the right time.

d. Participatory: The application of the technology enables them to know how to drill the termite mounds using termite mound driller by providing the material after showing them to drill for themselves.

Generally Every stakeholders should give a great attention to tackle the problems. *"We are overlooking what we can have, but we are importing what we don't have."*

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References

Abdurhaman Abdulahi. 1990. Foraging activity and control of termites in Western Ethiopia. Ph.D. thesis. Imperical college, London University.

Bernette E.A, R.H. Cowie, W.A. Sands and J.G.Wood. 1987. Identification of termite collected in Ethiopia. Report No C0696. Tropical research institute, London.

Cowie E.A, T.G.Wood, E.A.Bernette, W.C.Sands and H.i.j.Block. 1990. A check list of the termite of Ethiopia with a review of their biology, distribution and pest status. Africa Journal of Ecology 28:21-23.

Johnson, R.A. and Wood, T.G. (1980). Combating termites. West Africa Farming and Food processing, March 1980: 41-42.

Sands, W.A. (1960). Observations on termites' destractive to trees and crops. Pp.14-63. In Harris W.V. Termite research in West Africa (multigraph). Department of Technical co-operation, London.

Sannae 1973. Termites as agricultural pests in west Wollega. Report No. 7Appropriate technology unit CRDA. In T.G.Wood. Report on assessment of termite damage in Ethiopia. Addis Ababa, Ethiopia.

Temesgen Diriba, 1996. A preliminary study on the phenology and ecology of termite tolerant indigenous forage spps. At Gawo Dalle.

Wood, T, G.1986. Assessment of termite damage in Ethiopia and recommendations for short-term control and development of long-term pest management strategies. Ministry of Agriculture. Addis Ababa, Ethiopia.

Wood T.G. and R.A. Johnson, 1986. The biology, physiology and ecology of termites. P. 1-68. In: S.B.Vinson (ed) Economic impact on control of social insects. Praeger, New York.