

Field Survey of cassava susceptibility to termite infestation as influenced by time, scale and management strategy in selected Owerri Agricultural zones, Southeast Nigeria.

ABSTRACT

Start with problem statement sentence (e.g. In Africa, cassava provides a basic daily source of dietary energy and has gained popularity as one of the most important root crops in Nigeria especially in the Southern States. However, a thorough survey on cassava susceptibility to termite infestation in relation to time and management strategy has not received attention by farmers in Owerri (Southeastern Nigeria). Therefore, the need to carry out field survey of cassava susceptibility to termite infestation as influence by time, scale and management strategy in selected Owerri Agricultural zones. The field survey was conducted in 2016 in four selected Agricultural zones of Owerri, **Southeastern Nigeria** namely; Ezinnihite Mbaise (Zone 1), Owerri North (Zone 2), Mbaitoli (Zone 3) and Owerri West (Zone 4). A random selection of **thirty 30** cassava farmers from each of the study areas was made, totaling. **The sample size was made up of a total of one hundred and twenty (120)** respondents. Data were collected through structural questionnaire administration to the respondents on the four selected zones and were analyzed using Descriptive Statistics **such as the use of Percentages, Frequencies and Means**. Result shows that cassava stems were more susceptible to termite attack than tubers, especially during dry periods. Equally cassava devastation by termite occurred mostly at planting where newly planted cuttings suffered most. **Also, the study reveals that t**Termite infestation on cassava was more between January and May as well as between October and December. Where are results on scale? On the other hand, **respondents submitted that** the use of chemical control either singly or in synergy with other non- chemical means to control termites appears to be very popular amongst respondents **in the study area. Result also shows that y**Youths and mature adults were actively engaged in cassava farming, but the majority of them were **evidently** unskilled by virtue of their low literacy levels. Farmer education is recommended to enable the integration of pest/termite avoidance principle into termite control strategy **across the zones under study.**

Key words: Termite, survey, cassava, infestation, time, zone.

24 [See Journal Guidelines](#)

25 [SAMPLE ABSTRACT:](#)

26 **Aims:** Here clearly write the aims of this study. **Sample:** To correlate platelet count, splenic
27 index (SI), platelet count/spleen diameter ratio and portal-systemic venous collaterals with
28 the presence of esophageal varices in advanced liver disease to validate other screening
29 parameters.

30 **Study design:** Mention the design of the study here.

31 **Place and Duration of Study: Sample:** Department of Medicine (Medical Unit IV) and
32 Department of Radiology, Services Institute of Medical Sciences (SIMS), Services Hospital
33 Lahore, between June 2009 and July 2010.

34 **Methodology:** Please write main points of the research methodology applied. **Sample:** We
35 included 63 patients (40 men, 23 women; age range 18-75 years) with liver cirrhosis and
36 portal hypertension, with or without the medical history of gastrointestinal bleeding. Clinical
37 as well as hematological examination (platelet count) and ultrasonography (gray as well as
38 color Doppler scale including splenic index and splenorenal/ pancreaticoduodenal
39 collaterals) was done besides upper GI endoscopy for esophageal varices. Platelet
40 count/spleen diameter ratio was also calculated.

41 **Results:** Kindly make sure to include relevant statistics here, such as sample sizes, response
42 rates, P-values or Confidence Intervals. Do not just say "there were differences between the
43 groups". **sample:** Out of 63 patients, 36 patients with small varices (F1/F2) and 27 with
44 larger (F3) varices were detected on endoscope. Significant increase in mean splenic index
45 from low (86.7 +/- 27.4) to high (94.7 +/- 27.7) grade varices was documented. Opposite trend
46 was found with platelets (120.2 +/- 63.5 to 69.8 +/- 36.1) and platelets/ splenic diameter ratio
47 (1676.7 to 824.6) declining significantly. Logistic regression showed splenic collaterals and
48 platelets are significantly but negatively associated with esophageal varices grades.

49 **Conclusion:** Non-invasive independent predictors for screening esophageal varices may
50 decrease medical as well as financial burden, hence improving the management of cirrhotic
51 patients. These predictors, however, need further work to validate reliability.

52

53 [See Journal Guidelines:](#)

54 [There is no strict page limit for a Short Communication; however, we advise a length of](#)
55 [2500-3500 words \(this manuscript contain 4377 words\), plus 2-3 figures and/or tables \(this](#)
56 [manuscript contain 9 Tables\), and 15-20 key references \(this manuscript contain 21](#)
57 [references\).](#)

58

59 1 .INTRODUCTION

60 Cassava (*Manihot esculenta* Crantz.) is a perennial woody shrub with an edible root which grows in
61 tropical and sub-tropical areas of the world. It has the ability to grow on marginal lands and can
62 tolerate long dry spell (IITA, 2000 - [In the text, citations should ONLY be indicated by the reference](#)
63 [number in brackets \[3\]](#)) [1]. However, cassava does well on well drained, rich and friable loamy soils
64 (Akinsanmi, 1987) [2].

65 In Africa, cassava provides a basic daily source of dietary energy and has gained popularity as one of
66 the most important root crops in Nigeria especially in the Southern States (Nwokoma, 1998) [3].
67 Cassava is the second most important staple food in sub-saharan Africa and accounts for more than
68 100 calories per day in the diet of an individual (IITA, 1988) [4].

69 Cassava roots are processed into a wide variety of granules, pastes, flour etc. or consumed freshly
70 boiled or raw. It is used in the production of starch, garri, 'foo-foo', wet and dry chips (Nwokoma,
71 1998) [3]. The fresh cassava tuber can be used considerably as a source of feed for livestock (sheep,
72 goats, cattle, pigs etc.). In many rural households, cassava peel is fed to domestic animals (Ihekoronye
73 and Ngoddy, 1985) [5].

74 In the traditional farming systems where cassava is usually one of the many crops being grown, pest
75 control is often given a low priority and so cassava receives minimal pesticide application. Under
76 such conditions yields are often low (Henry, 1995) [6]. Arthropod pests and diseases are major
77 factors causing this yield reduction (Belloti *et al.*, 1999) [7]. In the humid lowlands, the predominant
78 diseases of cassava include: cassava mosaic virus (CMV), cassava bacterial blight (CBB), cassava
79 anthracnose disease (CAD) and root rots. The major insect pests are cassava green mite (CGM:
80 *Mononychellus* spp.), elephant grasshopper (*Zonocerus elegans* L. and *Zonocerus variegatus* Thumb.),
81 cassava mealybug (CM: *Phenacoccus manihotis*), a wide range of rodents and termites (Hillocks and
82 Thresh, 2002) [8].

83 A survey of the distribution of termites in the country by Malaka (1973) [9] has revealed that certain
84 species are restricted to a particular vegetation zone while some are distributed all over the zones.
85 For instance, rainforest appears to have more dominant species than other vegetation zones. About
86 26 species have been recorded from the Guinea Savanna (ODM, 1997) [10] and of which only 10 are
87 dominant. Altogether 120 species of termites have been identified in Nigeria (Logan *et al.*, 1992) [11]
88 out of which only 20 damage crops and building

89 However, a thorough survey on cassava susceptibility to termite infestation in relation to time and
90 management strategy has not received attention by our farmers in Owerri , therefore, the need to
91 carry out field survey of cassava susceptibility to termite infestation as influence by time, scale and
92 management strategy in selected Owerri Agricultural zones of Southeastern Nigeria forms the
93 objective of this study.

94 [The newest reference used in Introduction is: 2002 – already 17 years old!! Most sources from 1980s](#)
95 [and 1990s – The authors are urged to upgrade the information by using newer sources from the most](#)
96 [recent years - past 5 years \(2014-2019\)!](#)

97 1. [\(Why again numbered 1?\)](#) Materials and Methods

98 The study was conducted in 2016 cropping season. It was carried out in Owerri Agricultural zone
99 located at the South-western part of Imo State. Owerri is located between Latitude 4^o 40ⁱ and 8^o 15ⁱ N

100 and Longitude 6° 40' and 8° 15' E (FDALR, 1985) [12]. It is of the humid tropics. It records means
101 annual rainfall of about 18000 mm-2190 mm which spans from early March to October. The
102 minimum and maximum mean annual temperatures were 22.5°C and 31.9°C respectively with
103 relative humidity of about 82.6%. (Nwosu and Adeniyi, 1980) [13]. The zone comprises ten Local
104 Government Areas, namely; Aboh Mbaise, Ahiazu Mbaise, Ezinihite Mbaise, Mbaitoli, Ikeduru, Ngor-
105 okpala, Ohaji/ Egbema, Owerri Municipal, Owerri North and Owerri West. Farmers in the zone are
106 mainly small holders known for growing such arable crops as maize, melon, yam, cassava etc. (ISADP.
107 2000) [14].

108 Four out of the ten Local Government Areas were randomly selected for the study. The selected areas
109 are Ezinihite Mbaise in Owutu Community, Owerri North in Azaraubo Community, Mbaitoli in
110 Obinnoha Community, and Owerri West in Obinze Community. These areas were selected based on
111 the quantum of cassava cultivation that was being carried out by farmers. A random selection of
112 thirty cassava farmers from each of the study areas who had admittedly been producing cassava for
113 the past ten years was made. The sample size was made up of a total of one hundred and twenty
114 (120) respondents.

115 Data was collected through structured questionnaire administration to the respondents on the four
116 selected local Government Areas.

117 All Data collected were analyzed using Descriptive Statistics such as the use of Percentages,
118 Frequencies and Means.

119 **3. (What happened to number 2?) Results and DISCUSSION (why results in lowercase, but**
120 **DISCUSSION in uppercase lettering?)**

121 **The abstract indicate: "Therefore, the need to carry out field survey of cassava susceptibility to**
122 **termite infestation as influence by time, scale and management strategy in selected**
123 **Owerri Agricultural zones." Thus the results and discussion section should be structured**
124 **according to the following sub-headings:**

125 **3.1 Influence of time**

126 **3.2 Influence of scale**

127 **3.3 Management strategy**

128
129 Table 1 indicates the degree of susceptibility of different parts of cassava plant to termites infestation
130 in the field. 50.00% (zone 4) and 43.33% (zone 1) proportion of the respondents under study claimed
131 that cassava stems tend to exhibit high susceptibility to termites infestation. Also, 33.33% (zone 2)
132 and 20.00% (zone 1) of them accepted that cassava leaves were attacked by termites, while 6.67%
133 (zone 4), 3.33% (zones 1 and 2) and 0.00% (zone 3) agreed that cassava tubers were susceptible to
134 termites infestation. In the same Table, 60.00% multiple responses from zone 3 claimed that optimal
135 termites infestation in cassava field was recorded on different parts of the plant. **DISCUSSION**
136 **ABSENT!**

137 **See Journal Guidelines: Tables & figures should be placed inside the text right after 1st mention in**
138 **paragraph.**

139 Also, the distribution of the different levels of termite damage to cassava at various growth phases
140 was presented in Table 2. Result reveals that 73.33% (zone 4) and 56.67% (zone 1) proportion of the

141 respondent sampled in the study area claimed that cassava incurred more damage from termites
142 infestation at planting (establishment) period. This was upheld by 50.00% (zone 2) and 36.67%
143 (zone 3) proportion of them. Equally, 16.67% (zones 1 and 4) and 23.33% (zone 1) of the
144 respondents agreed that termites cause economic damage to cassava at maturity and harvest periods
145 respectively. Also, the table shows the distribution of respondents by their regular observation in the
146 study area (multiple responses) where 53.33%(zone 3) and 36.67% (zone 2) agreed that attack on
147 cassava by termites occurs at any period of its growth phase. [DISCUSSION OF ALL RESULTS ABSENT!](#)

148
149 The high susceptibility of cassava stems to termites attack as well as the plant's prone to attack at
150 planting period as claimed by respondents was in line with Onwueme (1978) [15] that termite
151 activities in cassava field are more devastating on the stems and at early stages of their development
152 resulting to poor stand establishment. [THIS DISCUSSION OF TABLE 2 RESULTS INSUFFICIENT - HOW
153 RELATE TO OTHER SIMILAR STUDIES? If similar, what does the "trend" indicate? If different, why
154 not in line with similar studies? What do the results mean? What conclusions can be drawn? What
155 recommendation can be made?](#)

156 Table 3 presents the distribution of termite infestation in cassava field by time. 43.33% (zone 4),
157 33.33% (zone 1), 30.00% (zone 3) and 16.67% (zone 2) proportion of the respondents agreed that
158 termites infestation occur from January to May, while 46.67% (zones 1 and 2), 40% (zone 3) and
159 50.00% (zone 4) proportion of them claimed that infestation takes place more in October to
160 December. However, 20.00% (zone 1) and 13.33% (zone 2) of the respondents accepted that termites
161 infestation occur in June to September

162 This claim that termite infestation on cassava was more extensive between January to May and
163 between October to December, implies that optimal periods of termites infestation in cassava field
164 coincides with periods of prolonged dry spell. This is in conformity with Taylor (1977) [16] who
165 reported that termites attack the roots, tubers, young seedlings, shoots and stems of crops and their
166 damage is more extensive during the dry season when the crops are weakened by water stress or
167 drought.

168 Table 4 shows the distribution of economic loss from termites in cassava field by plant part. Majority
169 of the cassava farmers sampled under the study area across the zones admitted that the greatest
170 economic loss from termites infestation occur on the stems. 50.00% (zone 4) and 46.67% (zone 1)
171 proportion of them believed that greatest economic loss on cassava by termites comes from the
172 stems. On the other hand, none of the respondents in zone 1 (0.00%) and zone 3 (0.00%) agreed that
173 cassava leaves exhibited any evidence of economic loss from termites infestation. However, 6.67%
174 (zone 4) and 3.33% (zone 2) proportion of them accepted that cassava leaves suffered economic loss
175 from termites. Equally, 26.67% (zone 2) and 16.67% (zone 4) of the respondents maintained that
176 cassava tubers also showed marked evidences of economic loss from termites. In the same vain,
177 56.67% (zone 3) and 40.00% (zone 1) from multiple responses claimed that huge economic losses
178 were recorded on different parts of the plant, while 26.67% (zones 2 and 4) proportion of them
179 concurred to this claim

180 Higher economic loss from cassava stems as a result of termite infestation was described by Nweke *et*
181 *al.* (1994), [17] that cassava field planted early or late in the rainy season often have poor
182 establishment record because termites feed on the planted sticks (cuttings).

183 Result in Table 5 shows different methods of termites control measures employed by farmers in their
184 cassava field. Majority of the respondents in zone 4 (30.00%) and zone 2 (60.00%) claimed to employ

185 cultural and chemical methods of control respectively. On the other hand, 3.33% (zone 2) of the
186 respondents employed Biological method. In the same Table, 73.33% (zone 3) and 43.33% (zone 1)
187 of the farmers sampled agreed to employ two or more different methods (multiple responses) of
188 control. This claim was upheld by 33.33% (zone 4) and 10.00% (zone 2) proportion of them

189 Application of chemical control and other non-chemical means at different periods of time either
190 singly or in synergy in the cassava field to control termites appears to be very popular amongst
191 respondents in the study area. Though chemical control is effective but most chemical control
192 measures rely principally on the use of organo-chlorine insecticides such as aldrin, dieldrin, lindane
193 etc. (Umeh, 2002) [18]. Unfortunately this type of control measure is no longer popular due to the
194 associated environmental contamination and health hazards (PAN, UK, 2003) [19]. Any control
195 measure that ensures adequate synergy of these methods and which promote the rapid growth of
196 healthy crop is a suitable means for avoiding termites damage (Schmutterer *et al.*, 1978) [20].

197 The Socio-economic characteristics of respondents were described in Tables 6, 7, 8 and 9 below. In
198 Table 6, 33.33% (zone 2) and 16.67% (zone 1) of the respondents sampled under the study area were
199 between the age group of 25-40 years, while 56.67% (zone 1), 46.67% (zone 2) and 36.67% (zones 3
200 and 4) were between 41-55 years. Also, 56.67% (zone 3) and 50.00% (zone 4) were between the age
201 group of 56-70 years and 6.67% (zone 3) and 3.33% (zone 1) were between 71-100 years. However,
202 the mean age group of respondents were 50.17% (zone 1), 45.83% (zone 2), 59.00% (zone 3) and
203 53.43% (zone 4).

204 In Table 7, larger proportion of the cassava farmers in zone 2 (100.00%), zone 1 (90.00%), zone 4
205 (83.34%) and zone 3 (80.00%) sampled cultivated under farm size of 1-5 hectares (ha) while, 10.00%
206 (zone 1), 20.00% (zone 3) and 13.33% (zone 4) of them had farm size of 6ha and above. The mean
207 land area were 3.5ha (zone 1), 3.00 (zone 2), 4.00ha (zone 3) and 3.57ha (zone 4). On the other hand,
208 Table 8 shows that majority of respondents in zones 1 and 2 (70.00%) and zone 4 (60.00%) sampled
209 were males, while 56.67% (zone 3) were females.

210 Apart from that, Table 9 indicates that 93.33% (zone 3), 70.00% (zone 1), 56.67% (zone 2) and
211 50.00% (zone 4) of the respondents sampled acquired non-degree educational training. However,
212 36.67% (zone 2) and 26.67% (zone 1) of them obtained Bachelor of Science Degree, while 30.00%
213 (zone 4) had Master of Science Degree.

214 Different ages and mean age of respondents sampled found to fall between the range of 25-70 years
215 and 59.00 years respectively, implies that majority of them were at their productive age group. It also
216 shows that youths and mature adults are actively involved in cassava production. Equally, the
217 indication that majority of the respondents cultivated under land area of 1-5 ha and on mean land
218 area of 4.00 ha across the zones, showed that land as a productive resource was not a constraint in
219 the study area. Also, on the gender balancing and participation, majority of the respondents were
220 males. This is probably because traditionally, men have right to land than women. Quisumbing
221 (1994) [21] opined that there has been a great disparity between women and men in the size of
222 landholdings. Apart from that, majority of the respondents sampled were found to be literate but
223 obtained certificates other than Degree. This implies that larger proportion of them were primarily
224 un-skilled.

225 **Conclusion/Recommendation (short communications as a rule do not have**
226 **conclusion/recommendation section - this information should be incorporated into the**
227 **results and discussion section)**

228 Termite infestation in cassava field and their subsequent attack were more severe during dry periods
 229 than in wet season. However, cassava stems appeared to be more susceptible to attack than the
 230 tubers. On the other hand, farmers in the study areas combined chemical and cultural means as
 231 method of controlling termites in their cassava field.

232 Equally, the study indicated that youths and mature adults actively engaged in cassava farming.
 233 However, greater proportion of the respondents agreed that land as a productive resource was not a
 234 limiting factor. Finally, majority of the farmers sampled were primarily unskilled evidenced in their
 235 low literacy level.

236 Farmers in a termite endemic area such as Owerri, Imo State, Nigeria are advised to be conscious of
 237 the two extremes of heavy termite infestation by ensuring that planting of cassava is not carried out
 238 between January and May. Also harvesting of cassava tubers should not be delayed up to October
 239 through December in the season. However, the study strictly recommends that farmers under this
 240 condition should adopt late planting and early harvesting options.

241 Also, Farmers through the acquisition of qualitative education can aptly adopt the use of pest
 242 avoidance strategy in such a manner that sound and sustainable peculiar termite control package
 243 across the zones under study can be achieved. This will not only be efficacious in reducing termite
 244 load and damage on cassava but also economical in application.

245 **Tables & figures should be placed inside the text (Results and Discussion section). Tables**
 246 **should be presented as per their appearance in the text. It is suggested that the discussion**
 247 **about the tables should appear in the text before the appearance of the respective. No tables**
 248 **should be given without discussion or reference inside the text. Tables should be explanatory**
 249 **enough to be understandable without any text reference. Double spacing should be maintained**
 250 **throughout the table, including table headings and footnotes. Table headings should be placed**
 251 **above the table. Footnotes should be placed below the table with superscript lowercase**
 252 **letters.**

253 **Table 1: Frequency and Percentage Distribution of Plant Parts Most Susceptible to Attack by**
 254 **Termites According to Zones**

Plant Part	Zone 1		Zone 2		Zone 3		Zone 4	
	Frequency	Percent (%)	Frequency	Percent (%)	Frequency	Percent (%)	Frequency	Percent (%)
Stems	13.00	43.33	9.00	30.00	10.00	33.33	15.00	50.00
Leaves	6.00	20.00	10.00	33.33	2.00	6.67	1.00	3.33
Tubers	1.00	3.33	1.00	3.33	0.00	0.00	2.00	6.67
All Parts	3.00	10.00	3.00	10.00	0.00	0.00	5.00	16.67
Multiple rep.	7.00	23.34	7.00	23.34	18.00	60.00	7.00	23.33

Total	30	100	30	100	30	100	30	100
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255 **Source: Computed from Field Survey Data (2016).**

256 **Table 2: Frequency and Percentage Distribution of Damage at Different Plant Growth Phases**
 257 **According to Zone**

Growth phase	Zone 1		Zone 2		Zone 3		Zone 4	
	Frequency	Percent (%)	Frequency	Percent (%)	Frequency	Percent (%)	Frequency	Percent (%)
planting	17.00	56.67	15.00	50.00	11.00	36.67	22.00	73.33
maturity	5.00	16.67	4.00	13.33	3.00	10.00	5.00	16.67
harvest	7.00	23.33	0.00	0.00	0.00	0.00	3.00	10.00
multiple rep	1.00	3.33	11.00	36.67	16.00	53.33	0.00	0.00
Total	30	100	30	100	30	100	30	100

258 **Source: Computed from Field Survey Data (2016).**

259
 260 **Table 3: Frequency and Percentage Distribution of Termites Infestation by Time According to**
 261 **Zones**

Time (months)	Zone 1		Zone 2		Zone 3		Zone 4	
	Frequency	Percent (%)	Frequency	Percent (%)	Frequency	Percent (%)	Frequency	Percent (%)
Jan - May	10.00	33.33	5.00	16.67	9.00	30.00	13.00	43.33
June - Sept	6.00	20.00	4.00	13.33	0.00	0.00	2.00	6.67
Oct - Dec	14.00	46.67	14.00	46.67	12.00	40.00	15.00	50.00
Multiple rep.	0.00	0.00	7.00	23.33	9.00	30.00	0.00	0.00
Total	30	100	30	100	30	100	30	100

262 **Source: Computed from Field Survey Data (2016).**

263
 264 **Table 4: Frequency and Percentage Distribution of Economic Loss from Termites by Plant Part**
 265 **According to Zones**

Plant part	Zone 1		Zone 2		Zone 3		Zone 4	
	Frequency	Percent (%)	Frequency	Percent (%)	Frequency	Percent (%)	Frequency	Percent (%)
Stems	14.00	46.67	13.00	43.33	10.00	33.33	15.00	50.00

Leaves	0.00	0.00	1.00	3.33	0.00	0.00	2.00	6.67
Tubers	4.00	13.33	8.00	26.67	3.00	10.00	5.00	16.67
Multiple rep.	12.00	40.00	8.00	26.67	17.00	56.67	8.00	26.66
Total	30	100	30	100	30	100	30	100

266 Source: Computed from Field Survey Data (2016)

267

268 Table 5: Frequency and Percentage Distribution of Control Measures in Use According to
269 Zones

Control Method	Zone 1		Zone 2		Zone 3		Zone 4	
	Frequency Percent (%)	Frequency Percent (%)	Frequency Percent (%)	Frequency Percent (%)	Frequency Percent (%)	Frequency Percent (%)	Frequency Percent (%)	
Cultural	8.00	26.67	5.00	16.67	5.00	16.67	9.00	30.00
Chemical	6.00	20.00	18.00	60.00	1.00	3.33	7.00	23.34
Biological	0.00	0.00	1.00	3.33	0.00	0.00	0.00	0.00
All	2.00	6.67	0.00	0.00	0.00	0.00	4.00	13.33
Multiple rep.	13.00	43.33	3.00	10.00	22.00	73.33	10.00	33.33
Others	1.00	3.33	3.00	10.00	2.00	6.67	0.00	0.00
Total	30	100	30	100	30	100	30	100

270 Source: Computed from Field Survey Data (2016).

271

272

273 Table 6: Frequency and Percentage Distribution of Farmers by Age According to Zones

Age of Farmers	Zone 1		Zone 2		Zone 3		Zone 4	
	Frequency Percent (%)	Frequency Percent (%)	Frequency Percent (%)	Frequency Percent (%)	Frequency Percent (%)	Frequency Percent (%)	Frequency Percent (%)	
25 - 40	5.00	16.67	10.00	33.33	0.00	0.00	4.00	13.33
41 - 50	17.00	56.67	14.00	46.67	11.00	36.67	11.00	36.67
56 - 70	7.00	23.33	6.00	20.00	17.00	56.66	15.00	50.00
71 - 100	1.00	3.33	0.00	0.00	2.00	6.67	0.00	0.00
Total	30	100	30	100	30	100	30	100

Mean	50.17	45.83	59	53.43
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274 **Source: Computed from Field Survey Data (2016).**

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276 **Table 7: Frequency and Percentage Distribution of Farmers by Farm Size According to Zones**

Farm Size (ha)	Zone 1		Zone 2		Zone 3		Zone 4	
	Frequency	Percent (%)	Frequency	Percent (%)	Frequency	Percent (%)	Frequency	Percent (%)
1 – 5	27.00	90.00	30.00	100.00	24.00	80.00	25.00	83.34
6 – 10	3.00	10.00	0.00	0.00	6.00	20.00	4.00	13.33
11 – 15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16 - 20	0.00	0.00	0.00	0.00	0.00	0.00	1.00	3.33
Total	30	100	30	100	30	100	30	100
Mean	3.5		3		4		3.57	

277 **Source: Computed from Field Survey Data (2016).**

278

279 **Table 8: Frequency and Percentage Distribution of Farmers by Gender According to Zones**

Gender	Zone 1		Zone 2		Zone 3		Zone 4	
	Frequency	Percent (%)	Frequency	Percent (%)	Frequency	Percent (%)	Frequency	Percent (%)
Male	21.00	70.00	21.00	70.00	13.00	43.33	18.00	60.00
Female	9.00	30.00	9.00	30.00	17.00	56.67	12.00	40.00
Total	30	100	30	100	30	100	30	100

280 **Source: Computed from Field Survey Data (2016).**

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Table 9: Frequency and Percentage Distribution of Farmers by Level of Education According to Zones

Education	Zone 1		Zone 2		Zone 3		Zone 4	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
		(%)		(%)		(%)		(%)
B.Sc	8.00	26.67	11.00	36.67	2.00	6.67	5.00	16.67
M.Sc	1.00	3.33	1.00	3.33	0.00	0.00	9.00	30.00
Ph.D	0.00	0.00	1.00	3.33	0.00	0.00	1.00	3.33
Others	21.00	70.00	17.00	56.67	28.00	93.33	15.00	50.00
Total	30	100	30	100	30	100	30	100

Source: Computed from Field Survey Data (2016).

COMPETING INTERESTS Authors have declared that no competing interests exist.

AUTHORS' CONTRIBUTIONS

Authors may use the following wording for this section: " 'Author A' designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. 'Author B' and 'Author C' managed the analyses of the study. 'Author C' managed the literature searches..... All authors read and approved the final manuscript."

CONSENT (WHERE EVER APPLICABLE)

Authors may use the following wording for this section: "All authors declare that 'written informed consent was obtained from the interviewees (or other approved parties) for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editorial office/Chief Editor/Editorial Board members of this journal."

311 **ETHICAL APPROVAL (WHERE INTERVIEWING PEOPLE)**

312 **If human subjects (interviewees) are involved, informed consent, protection of privacy, and**
313 **other human rights are further criteria against which the manuscript will be judged. It should**
314 **provide a statement to confirm that the authors have obtained all necessary ethical approval**
315 **from suitable Institutional or State or National or International Committee. This confirms**
316 **either that this study is not against the public interest, or that the release of information is**
317 **allowed by legislation.**

318 **All manuscripts which deal with the study of human subjects (interviewees) must be**
319 **accompanied by Institutional Review Board (IRB) or Ethical Committee Approval, or the**
320 **national or regional equivalent. The name of the Board or Committee giving approval and the**
321 **study number assigned must accompany the submission. If required, the author should be**
322 **ready to submit a scanned copy of the IRB or Ethical Committee Approval at any stage of**
323 **publication (Pre or post publication stage).**

324

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326 **Reference style**

327 References must be listed at the end of the manuscript and numbered in the order that they appear in
328 the text. Every reference referred in the text must also present in the reference list and vice versa. In
329 the text, citations should be indicated by the reference number in brackets [3].

330 Only published or accepted manuscripts should be included in the reference list. Articles submitted for
331 publication, unpublished findings and personal communications should not be included in the
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333 results or personal communication). Avoid citing a "personal communication" unless it provides
334 essential information not available from a public source, in which case the name of the person and
335 date of communication should be cited in parentheses in the text. For scientific articles, obtain written
336 permission and confirmation of accuracy from the source of a personal communication. An
337 unpublished result which has been accepted for publication in any journal should be cited as "in
338 press". Journal name abbreviations should be those found in the NCBI databases
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340 **Note: All SDI journals will follow this new reference style, effective from 09 Oct, 2012.**

341

342 All references should follow the following style:

343 **Reference to a journal:**

344 *For Published paper:*

345 1. Hilly M, Adams ML, Nelson SC. A study of digit fusion in the mouse embryo. Clin Exp Allergy.
346 2002;32(4):489-98.

347 Note: List the first six authors followed by et al.

348 Note: Use of DOI number for the full-text article is encouraged. (if available).

349 Note: Authors are also encouraged to add other database's unique identifier (like PUBMED ID).

350 [For Accepted, unpublished papers.](#)
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Appendix

SECTION A (Biodata)

- 1. Name of Respondent:**.....
- 2. Age:**
- 3 Gender:**.....
- 4 Marital Status:**.....
- 5 Educational Attainment:**
(i) B.Sc. (ii) M.Sc. (iii) Ph.D (iv) Any other
- 6 Occupation**
(i) Farming(ii) Trading (iii) Civil Servant (iv) Any other
- 7 Farm location**
 - a. TOWN
 - b. VILLAGE
- 8 Farm Size**
- 9 Number of Farm Organization you belong:**.....
- 10 ANY OTHER INFORMATION:**.....

SECTION B (Specific Objectives)

a. CASSAVA CULTIVATION

i. Do you grow Cassava in your Farm?

Yes () No ()

ii. If yes, what variety (ies)

- TMS 30555
- TMS 30572
- TMS 4(2)1425
- NR 8083
- ANY OTHER

- 468 **iii. What problems do you often encounter in your cassava Farm?**
- 469 **b.PESTS**
- 470 **i.Do you encounter pests problems in your Farm?**
- 471 Yes () No ()
- 472 **i. If yes , name the common pests that attack the crop**
- 473 (a) Grasshopper (b) Mealybug (c) Green spider mites (d) Termites (e) Any other
- 474 **ii. Indicate the parts of the plant that are mostly affected by the named pests**
- 475
- 476 (a) Stems (b) Leaves (c) Tubers (d) All of the above
- 477 **iv.Do Termites pose serious problem to cassava cultivation in your locality?**
- 478 Yes () No ()
- 479 **v. If yes, what time of the year do Termites become more prevalent?**
- 480 **vi. Which part of the plant show more visible signs of attack in the field?**
- 481 (a) Stems (b) Leaves (c) Tubers (d) All of the above
- 482 **vii. Which stage of the plant development is more susceptible to termites attack?**
- 483 **ix. Do you recognize more than one kind of termites in your field?**
- 484 Yes () No ()
- 485 **x. If yes, specify names**
- 486 **xi. Specify the major losses that you experience from termites attack**
- 487 **xii. which part of the plant record more economic loss**
- 488 (a) Tubers (b) Stems (c) Leaves
- 489 **xiv. What is the degree of damage caused by termites**
- 490 a. 0% No Infestation
- 491 b. 1-20% Slight Infestation
- 492 c. 21-40% Moderate Infestation
- 493 d. 41-60% Extensive Infestation
- 494 e. 61-80% Very Extensive Infestation
- 495 f. 81-100% Plant completely Infested
- 496 **Quantify the economic loss from termites**
- 497 (a) Readily (b) Significantly (c) Difficult (d) Not at all
- 498 **xv. What method(s) do you use to prevent or control termites?**

499 (a) Cultural (b) Chemical (c) Biological (d) All of the above

500 (e) None/ any other method.

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UNDER PEER REVIEW