Field validation of senesced banana leaf extracts for trapping banana weevils on smallholder banana/plantain farms

Article

Accepted Version

Table 1 Total numbers of adult banana weevils, *Cosmopolites sordidus*, captured at five field locations in Ashanti region, Ghana, using aggregation pheromone, senesced banana leaf palm alcohol extract, pseudostem, and combinations thereof, in type TAL and Voltic traps. Overall total and percentage of overall total capture for two groups (with/without pseudostem) of the five treatments are also shown.

Field (Type of trap)	**Duration of experiment (Weeks)**	**Aggregation pheromone plus banana leaf extract**	**Palm alcohol extract of banana leaf**	**Aggregation pheromone**	**Pseudostem plus banana leaf extract**	**Pseudostem**
1 (TAL)	12	151	20	109	10	5
2 (Voltic)	7	87	19	32	17	7
3 (TAL)	12	180	30	86	29	9
4 (Voltic)	12	433	51	197	15	7
5 (Voltic)	5	24	3	11	4	1
Total		**875**	**123**	**435**	**75**	**29**
Overall total		**1433**			**104**	
Percent weevil capture (%)		**61.1**	**8.5**	**30.4**	**72.1**	**27.9**

Table 2 Mean (± SE) number of adult banana weevils, *Cosmopolites sordidus*, caught per week in field trapping experiments in Ashanti region, Ghana, using aggregation pheromone, senesced banana leaf palm alcohol extract, pseudostem, and combinations thereof, in type TAL and Voltic traps. These are the data analysed in Table 3.

Field (Type of trap)	Aggregation pheromone plus banana leaf extract	Palm alcohol extract of banana leaf	Aggregation pheromone	Pseudostem plus banana leaf extract	Pseudostem
1 (TAL)	12.58±4.9	2.22±0.4	9.08±2.8	0.83±0.6	0.42±0.3
2 (Voltic)	12.43±5.4	2.71±1.6	4.57±1.3	2.43±1.1	1.00±0.4
3 (TAL)	15.00±3.2	3.33±0.8	7.17±2.6	2.42±1.4	0.75±0.6
4 (Voltic)	36.08±9.3	5.67±2.0	16.42±5.7	1.25±0.4	0.58±0.4
5 (Voltic)	4.80±1.5	0.60±0.3	2.20±0.7	0.80±0.6	0.20±0.2
Sum of means	**80.89**	**14.53**	**39.44**	**7.73**	**2.95**
Overall mean ± SE	**16.2 ± 5.3**	**2.9 ± 0.8**	**7.9 ± 2.4**	**1.5 ± 0.4**	**0.6 ± 0.1**

Table 3 Analysis of variance (ANOVA) of the mean weevil catches per week data (data in Table 2 transformed to natural logarithms). The table details the sources of variation, the degrees of freedom (df), sums of squares (ss), mean squares (ms) (*i.e.* the variances), variance ratios (vr) and the *P*-values for the F-tests of the sources of variation. The ANOVA factors are denoted: *TrapType*, for Voltic *vs.* TAL type of trap; *ExtractOnly*, for the palm alcohol extract of senesced banana leaves treatment *vs.* the factorial set of four treatments involving aggregation pheromone or pseudostem; *Extract*, for the main effect of presence or absence of palm alcohol extract of senesced banana leaves; and *Treatment*, for the main effect aggregation pheromone *vs.* pseudostem. The dot indicates the interaction between factors. Significant ($P < 0.05$) ANOVA factors of interest are given in bold.

Source of variation	df	ss	ms	vr	*P*-value
Field stratum					
TrapType	1	0.054	0.054	0.00	0.957
Residual	3	47.720	15.907	7.93	
Field.Trap stratum					
ExtractOnly	1	0.432	0.432	0.22	0.651
*ExtractOnly.**Extract***	1	31.456	31.456	15.68	**0.002**
*ExtractOnly.**Treatment***	1	304.937	304.9371	51.99	**<0.001**
ExtractOnly.TrapType	1	0.007	0.007	0.00	0.954
ExtractOnly.Extract.Treatment	1	0.685	0.685	0.34	0.570
ExtractOnly.Extract.TrapType	1	0.310	0.310	0.15	0.701
ExtractOnly.Treatment.TrapType	1	0.130	0.130	0.06	0.803
ExtractOnly.Extract.Treatment.TrapType	1	0.289	0.289	0.14	0.711
Residual	12	24.075	2.006		
Total	24	410.096			