EFFECTS OF REFLECTIVE MULCH ON APHID AND THRIP INFESTATION ON FRENCH BEANS

(Phaseolus vulgaris l)

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4TH YEAR BSC. AGRIC (CROP PROTECTION MAJOR)

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INTRODUCTION.

• Originated from S. America.
• Its the leading legume produced for export in Kenya.
• Grown for their immature pods consumed fresh or processed and canned.

• **Economic importance:**
  1. Employment as its labour intensive.
  2. Target foreign market thus foreign exchange earner.
  4. Rural development.
LIMITATIONS IN PRODUCTION.

• Poor and deficient soils
• Water stress
• High incidences of disease pest and insect pests
• High cost of fertilizers
• Severe competition from weeds
• High post harvest losses
• Fluctuating producer prices due to undefined markets.
PROBLEM STATEMENT

• Despite the increasing demand for French beans, production is very low due to insect pest damage especially bean aphid and thrips which transmit viruses and affect pod quality.

PROBLEM JUSTIFICATION;

• As farmers try to overcome the problem of pests, they have adopted calendar use of pesticides leading to high cost of production and is of environmental and human health concern due to high residual levels in products. There’s need to look for alternative ways of managing pests to reduce insecticide use.
OBJECTIVES

• Overall objective;
Improving production and quality of French beans in Kenya.

Specific objectives.
1. To determine the effects of reflective mulch on aphid infestation on French beans.
2. To determine loss of yield caused by bean aphid on French bean.

Hypothesis;
Reflective mulch do not affect aphid infestation on French bean.
• MATERIALS;
  - French bean seeds variety Venda
  - D.A.P and C.AN fertilizer
  - Planting line (spacing 30 x 20)
  - Watering can/ pipe
  - Magnifying lens
  - Pesticide chemical (Dimethoate)

• METHODOLOGY

• The project was set at Upper Kabete Campus field station
  A randomised complete block design was used with the following treatments;
Methodology cont.

- Treatment 1. Reflective mulch (t1)
- Treatment 2. Chemical control (t2)
- Treatment 3. Control (t3)
- Each treatment was replicated three times and randomised as below

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<table>
<thead>
<tr>
<th>Plot 1</th>
<th>Plot 2</th>
<th>Plot 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>t1</td>
<td>t2</td>
<td>t3</td>
</tr>
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<thead>
<tr>
<th>Plot 6</th>
<th>Plot 5</th>
<th>Plot 4</th>
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<tbody>
<tr>
<td>t3</td>
<td>t1</td>
<td>t2</td>
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<tr>
<th>Plot 7</th>
<th>Plot 8</th>
<th>Plot 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>t1</td>
<td>t2</td>
<td>t3</td>
</tr>
</tbody>
</table>
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PARAMETERS COLLECTED

1. Aphid population-collected on the upper leaves, mid leaves, and lower leaves on 5 plants per plot randomly picked. Data collected after every 4 days.

2. Thrips on flowers-5 flowers per plant, 5 plants per plot

3. Yield of 5 plants per plot divided on different qualities (Good, malformed and weight with thrip marks)

DATA ANALYSIS;

Analysis of variance was done using gen start software and the means were compared using least significant difference.
SAMPLES CLASSIFIED AS MALFORMED
Sample classified as good
APHIDS ON THE FRENCH BEANS
RESULTS

• AVERAGE MEANS OF APHIDS AND THRIPS.

<table>
<thead>
<tr>
<th>TREATMENT</th>
<th>APHID LOWER LEAF</th>
<th>APHID MIDDLE LEAF</th>
<th>APHID UPPER LEAF</th>
<th>APHID TOTAL</th>
<th>THRIPS TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>REFLECTIVE MULCH</td>
<td>64.3b</td>
<td>86.3b</td>
<td>98.5b</td>
<td>249.2b</td>
<td>52.2b</td>
</tr>
<tr>
<td>CHEMICAL</td>
<td>75.8b</td>
<td>84.6b</td>
<td>82.2b</td>
<td>242.0b</td>
<td>49.9b</td>
</tr>
<tr>
<td>CONTROL</td>
<td>151.1b</td>
<td>178.0a</td>
<td>153.7a</td>
<td>458.2a</td>
<td>88.3a</td>
</tr>
<tr>
<td>L.s.d</td>
<td>35.12</td>
<td>41.31</td>
<td>42.22</td>
<td>77.39</td>
<td>34.08</td>
</tr>
<tr>
<td>Cv%</td>
<td>21.8</td>
<td>23.0</td>
<td>22.8</td>
<td>14.7</td>
<td>32.4</td>
</tr>
</tbody>
</table>
TOTAL APHID DYNAMICS OVER TIME

NUMBER OF APHIDS

- Re’ mulch
- Chemical
- Control

TOTAL APHID MEAN DYNAMICS

WK1 | WK2 | WK3 | WK4 | WK5 | WK6
# EFFECTS OF REFLECTIVE MULCH ON QUALITY

<table>
<thead>
<tr>
<th>TREATMENT</th>
<th>GOOD QUALITY</th>
<th>MALFORMED</th>
<th>THRIP MARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>REFLECTIVE MULCH</td>
<td>88.3a</td>
<td>23.6b</td>
<td>27.2b</td>
</tr>
<tr>
<td>CHEMICAL</td>
<td>92.3a</td>
<td>20.9b</td>
<td>23.5b</td>
</tr>
<tr>
<td>CONTROL</td>
<td>23.4b</td>
<td>85.5a</td>
<td>65.3a</td>
</tr>
<tr>
<td>LSD</td>
<td>20.96</td>
<td>19.9</td>
<td>19.26</td>
</tr>
<tr>
<td>C.V%</td>
<td>18.6</td>
<td>26.7</td>
<td>30</td>
</tr>
</tbody>
</table>

Weights sampled in grams.
Qualities divided as;
Good - straight, length > 4 inches and no pest marks
Malformed – Curved, twisted and small length when mature
Thrip marks - weight with all pests’ marks
EFFECTS OF REFLECTIVE MULCH ON QUALITY

![Bar chart showing the effects of reflective mulch on quality. The chart compares Good Quality, Malformed, and Thrip Marks across Reflective Mulch, Chemical, and Control treatments.]
DISCUSSION.

• Reflective mulch was found to control aphids on lower leaves better than chemical.
• This indicates that chemical sprayed did not penetrate well to the lower leaves.
• Yield quality was highly affected by reflective mulch and by chemical, the control had highest % of poor quality.
CONCLUSION

• Reflective mulch was found to control aphids and thrips in a comparable way to chemicals.
• Small scale farmers can adopt use of reflective mulch as they are cheaper than chemicals and can be re-used and leave no harmful residues on French bean produce.
• THANKS FOR LISTENING

• I INVITE QUESTIONS.

• AND GOD BLESS YOU!