

**INTEGRATED CONTROL OF SOME SUGAR BEET PESTS**

**A Thesis**

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## Summary

Our earth faces a lot of problems such as economical Inflation, political and pollution ones. Pollution can be a simple example of market failure because of its effect on health. Integrated Pest Management (IPM) is the magic solution for this problem. IPM is essential for modern agriculture and improves profitability while reducing the impact of pest management on the environment and human health. Pesticide cutbacks could hit food prices. The use of a natural pesticide is of immense significance in view of the environmental and toxicological implications of the indiscriminate use of synthetic pesticides and overcoming / reducing the problem of increasing pest resistance. For this reason, this investigation was applied for finding chemical and environmentally-friendly approaches

This study consisted of two parts which involved the main parts of IPM programmes

:(Part one: Integrated Crop Management (ICM

Impacts of cultivars and sowing dates .  
management systems on main sugarbeet insects and yielding potential

Integrated use of the varietal susceptibility of three polygerm sugarbeet cultivars (i.e. Poly dema, Pelino and Gloria) under three sowing dates (10th of September , 10th of October, and 10th of November) were applied during two successive seasons 2005/06 and 2006/07 in order to recognize the susceptibility of polygerm sugarbeet cultivars to infest with the main key sugarbeet insects in El-Bostan region. The main conclusion at field :experiments was

The beet fly, *P. mixta* Vill. was firstly .  
.detected then tortoise beetle , *C. vittata* Vill

- The first appearance of *P. mixta* Vill. .۲**  
**was observed on the 25th of November, during the first two sowing**  
**.dates and at 25th of December during the 3rd one**
- The earliest infestation with the tortoise .۳**  
**beetle, *C. vittata* Vill. during the 1st, 2nd and 3rd sowing dates were**  
**recorded on 25th December, 10th January and 10th January,**  
**.respectively**
- The highest infestation with *P. mixta* was .۴**  
**.at 25th February, 25th March and 25th March in both seasons**
- The first sowing data harbored the least .۵**  
**.infestation with beet fly *P. mixta* Vill and tortoise beetle, *C. vittata* Vill**
- The population densities of *C. vittata* Vill. .۶**  
**increased, afterwards, successively as plant grew older towards the end**  
**.of season**
- The 3rd sowing date harbored the highest .۷**  
**.population of *P. mixta* Vill. and *C. vittata* Vill**
- The 1st one gave the least infestation with .۸**  
**.both mentioned insects**
- The cultivar Gloria and Poly dema were .۹**  
**the most resistant to infest by *P. mixta* and *C. vittata* Vill. ,**  
**.successively**
- Pelino was the most susceptible one to .۱۰**  
**.infest by previous insects**
- Poly dema cultivar had the highest root, .۱۱**  
**.top, and sugar yields**
- The highest percentage of T.S.S. and .۱۲**  
**sucrose and the lowest root, and top yields were obtained by sowing**  
**.Pelino cultivar**
- Gloria cultivar gave the least sugar yield, .۱۳**  
**.%T.S.S. % and sucrose**

There were no significant effects purity .percentage	.١٤
The 2nd sowing date gave the highest . %root, , sugar yields, T.S.S. % and sucrose	.١٥
The 3rd one had the least top yields, . %T.S.S. % & sucrose	.١٦
The 1st sowing date owned the highest .top yield and the lowest root, sugar yields	.١٧
Integrated use of an integrated process fertilization for enhanced sugarbeet	.٢

#### Mineral Nitrogen Fertilizers .٢.١

Nitrogen fertilizer management is important components of sugarbeet under Egyptian condition especially after raising the price of fertilization. Nitrogen fertilizer management from different sources (Ammonium Nitrate, Ammonium Sulphate and urea) and two combination applications between each fertilizer and 1 or 2 sprays foliar spray of urea 1% were applied on sugarbeet Poly dema cultivar. It was examined the effect of fertilization on population growth and .within-plant distribution of *P. mixta* Vill and *C. vittata* Vill

The findings of the integration use of different sources of mineral :nitrogen fertilizers appeared that

No significant difference for different .١  
sources of nitrogen fertilizers was observed to reduce the infestation with the main key insects , i.e., *P. mixta* Vill. and *C. vittata* Vill., root .fresh yeild

Urea enhanced some juice quality, i.e. .٢  
T.S.S.% and sucrose% , while Ammonium sulphate increased the .yields of top, and sugar

**Recommended fertilizer didn't improve  
.in any investigated sugarbeet characteristics** .۳

**The efficacy of spraying urea 1%  
indicated that** .۴

**.It slightly effected on yield components**

**It improved some juice quality. With  
.urea, top, sugar yields and purity percentage were improved**

**With ammonium sulphate, top yield,  
.T.S.S.% and sucrose% were raised**

**The results of combination with twice  
sprays of urea 1% revealed that** .۵

**It increased in values of the most  
.sugarbeet characteristics** ۵.۱

**Its application with urea raised root  
.and sugar yield** ۵.۲

**On contrast, this combination with  
ammonium sulphate improved fresh yield and slightly increased the  
infestation with the main sugarbeet insects (P. mixta Vill. and C.  
.(.vittata Vill** ۵.۳

**:General conclusion is**

**No significant differences among mineral  
.fertilizers when they were applied alone** .۱

**Spraying twice times of urea and  
.compained with urea improved the main sugarbeet attributes** .۲

**Twice sprays of urea 1% with ammonium  
.sulphate encouraged the infestation with beet fly and tortoise beetle** .۳

**Mineral fertilization with two sprays of  
urea may be a useful tactic to an integrated pest management (IPM)  
.programme for managing the sugarbeet characters** .۴

<b>Foliar fertilization and Bio-fertilization</b>	<b>.۲.۲</b>
<b>The foliar fertilizer Potassin F decreased the infestation with <i>C. vittata</i> Vill. and such effect increased root fresh yield, sugar yield, r</b>	<b>.۱</b>
<b>The second foliar fertilizer Citrin .declined the infestation with <i>P. mixta</i> Vill</b>	<b>.۲</b>
<b>The third one Ascobin increased top fresh . yields</b>	<b>.۳</b>
<b>The biofertilizer Cerealin increased the infestation with both key sugarbeet insects; viz., <i>P.mixta</i> Vill. and <i>C. vittata</i> Vill. which was reflected on the reduction of Root, top fresh .yields as well as sugar yield</b>	<b>.۴</b>

### **(Part Two: Integrated Pest Management (IPM**

**The control of pests in crops is still largely dominated by the use of pesticides, but with the increase in the incidence of resistance by plant pests to pesticides, plus mounting concern for the environmental over excessive agrochemical use, the search for alternative reliable methods .of pest control is gaining momentum**

**Using alternative insecticides in an Integrated sugarbeet beet insects Management Program is the main purpose of this study. In order to seek for selective biocides on sugarbeet key insects, it was conducted a field experiment with treatments of six insecticides and one mixture. The six biocides involved four groups of insecticide which were: organophosphorus (Profenofos as recommended insecticide), Oxime carbamate (Methomyl), Pyrethroid (Fenpropathrin) and three biorational insecticides (botanical insecticide (Azadirachtin) and two mineral oils (Capl-2 and Alboleum)). The mixture contained Profenofos and Alboleum (0.5 :0.5 v/v). These compounds were applied on Poly dema, sugarbeet cultivar which was sown on October 10th for two**

consecutive seasons 2005/06 and 2006/07. This study consisted of three parts as follows

**:a) In comparison with recommended insecticide**

**Recommended insecticide surpassed the other compounds in sugarbeet characters as well as infestation with the tested sugarbeet insects** .1

**All tested treatments were effective in keeping the key insects infestation below a pre-determined level** .2

**Two synthetic insecticides had superior effects on the tested sugarbeet characters** .3

**Oxime carbamate Methomyl had the greatest reduction of *P. mixta* Vill. and *C. vittata* Vill. , improved TFY % and declined T.S.S. % and sucrose** .4

**Synthetic pyrethroid Fenprothrin had high effect on both tested insects after Methomyl and the highest RFY, SY** .5

**.Two mineral oils had the lowest effects** .6

**Capl-2 had the least effect on reduction the key sugarbeet insects, TFY** .6.1

**.Alboleum gave the lowest RFY and Sugar yield** .6.2

**The botanical insecticide Azadirachtin and the mixture of Profenofos and Alboleum gave the highest T.T.S. % and sucrose** .7

**The mixture of Profenofos and Alboleum had antagonistic effects on reduction of infestation with *P. mixta* Vill. and *C. vittata* Vill., yield components. it had synergistic effects on T.T.S. % and Sucrose%. There was no significant effect on purity percentage** .8

**:In comparison with control treatment**

**All treatments had positive effects on reduction of infestation with *P. mixta* Vill. And *C. vittata* Vill. And increased yield components except Alboleum on TFY** .1

**Azadirachtin and Alboleum significantly increased both T.S.S.% and sucrose** .2

**T.S.S.% was significantly increased by applying Fenprothrin and recommended insecticide** .3

**IPM brings together into a workable combination the best strategies of all control methods that apply to a given problem created by the activities of pests. Subsequently the concept was broadened to include all suitable methods that could be used in complementary ways to reduce pest populations and keep them at levels which did not cause economic damage. And finally, an IPM program which could then be based on the previous findings consisted of the following treatments. Poly dema cultivar (the highest root and the most resistant to infest with *C. vittata* Vill.) will be cultivated at 10th of October . Also, the mineral fertilizer urea (for high quality of sugarbeet characters) at 80 kg N/faddan as surface broadcast application with 3 equal doses ( at 30, 45 and 60 days of sowing date), will be applied with twice sprays of urea 1% (after 75 and 90 days of sowing date) to reduce the infestation with sugarbeet insects. Foliar fertilizer Potassin F will be sprayed after 1, 1.5 and 2 months from sowing date which decreased the infestation with *C. vittata* Vill. And increased root fresh yield. Pesticide control, such as Profenofos, is used as necessary in a manner that minimizes economic, health and environmental risks**