

DEDICATION

**To the soul of my Mother With
deep love**

And for

My Family

**Father, Brothers, Husband,
Teachers and Friends**

With love

Ashwag

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First Sincere thanks to Allah who helped me and gave me health to finish this study.

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ABSTRACT

An integrated Pest Management (IPM) approach was adopted to minimize or nullify the use of insecticides in tomato fields. The study was carried out in 2006/2007-2007/2008 seasons at Shambat and Karari areas particularly to find out whether the yield of tomato, *Lycopersicon esculentum* (variety Peto86) can be increased without the use of synthetic insecticides. The following treatments were compared:

1. *Neem -seed-kernel hexane extract (2.5%) (Azadrachta indica) (No).*
2. *Cotton-seed-kernel hexane extract (2.5%) (Gossypium hirsutum)(Co).*
3. *Argel leaves aqueous extract at 37.3g/6L (Solenostemma argel) (S).*
4. *Soap solution at 25 ml /4L (So).*
5. *Actara®25wG at the rate of 0.75g/f (act) as (standard) (M).*
6. *Intercropping tomato with fenugreek (Trigonella foenum –graecum) (F).*
7. *Intercropping tomato with hot pepper (Capsicum annum) (H).*

8. Intercropping tomato with garlic *Allium sativum* (G).
9. Intercropping tomato with garad (*Acacia nilotica*) (A)
10. Intercropping tomato with neem (*Azadrachta indica*) seedlings (N).
11. Intercropping tomato with cafour (*Eucalyptus camaldulensis*) seedlings (E).
12. Control (tomato only) (C).

Both treatments spraying with dissolved materials and intercropping were tested to observe the effect of these treatments on the population dynamics of the whitefly *Bemisia tabaci*, leaf miner *Argomyza trifolii*, African bollworm (*Helicoverpa armigera*) (Hub) larvae as well as fruit damage by both pests and by the sun (sunscald) and predators (Coccinellidae larvae, Chrysopidae larvae, Hemiptera nymph and Spider). Observations were also made on other pests (Aphids) and diseases such as Tomato Leaf Curl (TLCV) virus and comparison between damage by leaf miner in tomato and the plants intercropped with tomato such as fenugreek, garlic, and hot pepper were done. In addition to other observations on the damage caused by blossom end rot and the effect of sunlight on the growth of seedlings in the nursery also were made.

The results showed that Actara, neem oil, and cotton oil were the superior treatments in controlling whitefly, whereas cotton oil, neem oil, and garlic were found effective in suppression the population of the leaf miner followed by neem, garad, cafour and Actara. argel seem to be attractive to leaf miners. Actara was better in protecting the natural enemies, followed by garlic, soap, garad, neem oil, argel, and neem .

Tomato fruits showed that, cotton oil and neem oil exhibited good results in controlling *Helicoverpa armigera*, but argel and garad were better in increasing the number of sound fruits. However, Actara, garad, neem and cafour treatments gave good results in the control of *Helicoverpa armigera*.

All above mentioned treatments (cotton oil, neem oil, argel and garad) resulted increased the size of tomato fruits. Soap gave the best result in increasing the number of small size of sound fruits.

Assessment of tomato plants damaged by leaf curl disease at Shambat indicated that neem and fenugreek treatments resulted in good protection of tomato plants from leaf curl disease, followed by Actara , cotton oil and soap, whereas argel, garlic, cafour and garad showed high level of damage by leaf curl disease. However there is no damage observed at Karari area in all the treatments.

The results in intercropping plots of fenugreek, garlic, and hot pepper with tomato plants at Shambat area indicated that hot pepper and garlic plants were not damaged by leaf miner while fenugreek plants were susceptible to damage by leaf miner. However, tomato intercropped with hot pepper gave good results; it gave low damage by leaf miner whereas tomato intercropped with fenugreek gave high damage by leaf miners.

*neem oil, cotton oil and fenugreek were the superior treatments in the control of Aphids, *Aphis gossypii*, followed by cafour and soap at both Shambat and Karari areas in 2007/2008 season.*

Also assessment of tomato fruits damaged by blossom end rot at Karari area showed that cotton oil and neem oil gave the best results in the control of blossom end rot. There was no blossom end rot damage appeared in the experimental site at Shambat.

Comparative study was also done comparing tomato seedlings exposed to the sun and seedlings grown under the shade after 20 days from germination in the nursery. The results indicated that the seedlings which were exposed to the sun were better than the shaded seedlings.

Spraying treatments gave the best result in production of tomato fruits ranging between (160.00- 117.36) ton/feddan which was achieved by argel and soap respectively. Whereas intercropping treatments exhibited low

production of tomato fruits ranging between (113.52- 93.60) ton/ feddan, which was achieved by garad and cafour respectively.

Finally, result show that the best production was in (2006/2007) season. Argel gave high production in tomato fruits ranging between (160.00- 42.24) ton/ feddan while cafour gave the last recorded in the production of tomato fruits ranging between (93.60-58.32) ton/ feddan.

الخلاصة

بهدف تخفيض او الغاء إستخدام (IPM) تم إختيار طريقة المكافحة المتكاملة للآفات المبيدات في حقل الطماطم. هذه الدراسة اجريت في موسمي (2006/2007)-(2007/2008) *Lycopersicon esculentum* في منطقتي شمبات وكرري للكشف عن إمكانية زيادة إنتاج الطماطم

بدون إستخدام المبيدات الكيميائية (Variety Peto86).

-تمت مقارنة المعاملات الآتية:

1. (No) (Azadrachta indica) المستخلص الهكساني لنواة بذرة النيم (2.5%).
2. (Co) 2.5 (Cotton spp) المستخلص الهكساني لنواة بذرة القطن (%).
3. (S) 37.3 (Solenostemma argel) المستخلص المائي لأوراق الحرجل g/6L تركيز.
4. (So) 25 ml /4L محلول الصابون.
5. (M) كمبيد قياسي g/f بمعدل 0.75 WG تركيز Actara 25® أكتارا.
6. (F) (Trigonella foenum –graecum) الزراعة البينية للطماطم مع نبات الحلبه.
7. (H) (Capsicum annum) الزراعة البينية للطماطم مع نبات الشطة.

8. ((G. (*Allium sativum*) الزراعة البينية للطماطم مع نبات الثوم
9. (A). (*Acacia nilotica*) الزراعة البينية للطماطم مع شتول القرص
10. (N). (*Azadrachta indica*) الزراعة البينية للطماطم مع شتول النيم
11. (E) (*Eucalyptus camaldulensis*) الزراعة البينية للطماطم مع شتول الكافور
12. (C) (الشاهد) طماطم فقط .

أجريت تجربتي رش وزراعة بينية لملاحظة تأثير المعاملات علي الديناميكا السكانية والاعداء الحيوية *Argomyza trifolii* وحافرة الأنفاق *Bemisia tabaci* للذبابة البيضاء *Helicoverpa armigera* (Hub) وملاحظة الثمار الصحيحة والمصابه بدودة اللوز الأفرديفة تمت ايضاً ملاحظات علي آفات اخري مثل (sunscald) والعامل الفيزيائي ضربة الشمس كذلك اجريت (TLCV) الأمراض كفيروس تجعد أوراق الطماطم *Aphis crassivora* المن م قارنه بين إصابة الآفات لنبات الطماطم والنباتات المزروعه معه مثل الحلبه والثوم blossom والشطة. بالأضافة لملاحظات اخري مثل اصابه ثمار الطماطم بالعفن القمي end rot . وكذلك تمت دراسة تأثير الضؤ علي نمو الشتول في المشتل

أظهرت النتائج علي اوراق الطماطم أن مبيد اكتارا وزيت النيم و زيت القطن هي افضل المعاملات في مكافحة الذبابة البيضاء بينما زيت النيم والقطن والثوم لها تأثير في خفض كثافة حافرة الانفاق يتبعها النيم والقرص والكافور ومبيد اكتارا. الحرجل يبدو أنه جاذب لحشرة حافرة الانفاق. كان مبيد اكتارا الافضل من حيث عدم تأثيرة علي الأعداء الحيوية . يتبعه الثوم والصابون والقرص وزيت النيم والحرجل ونبات النيم

أظهرت النتائج علي ثمار الطماطم أن زيت النيم وزيت القطن اعطت نتائج جيده في مكافحة دودة اللوز الأفرديفة و الحماية من ضربه الشمس . بينما معاملات مبيد اكتارا والقرص . والنيم والكافور اعطت نتائج جيدة في مكافحة الدودة اللوز الأفرديفة فقط

الحرجل والقرص أعطيا افضل النتائج في زيادة الثمار السليمة بينما معاملات زدت القطن والحرجل والقرص اعطت ثمار كبيرة في الحجم . الصابون اعطي نتيجة جيدة في زياده عدد الثمار السليمة لكنها صغيرة الحجم

إختبار اصابة نباتات الطماطم بمرض تجعد الأوراق في شمبات دلت علي أن معامليتي النيم والحلبه اعطت حماية جيدة لنباتات الطماطم من الاصابة بالمرض.بينما لم تلاحظ اي اصابه بالمرض في كرري . الزراعة البينية للطماطم مع نباتات الحلبه والثوم والفلعليه في

منطقة شمبات دلت علي ان نباتات الشطة والثوم غير قابلة للاصابة بحافرة الانفاق بينما نبات الحلبه حساس للاصابة بحافرة الانفاق. الطماطم المزروعة مع الشطة اعطت نتائج جيدة اذ انها اعطت اصابه منخفضة بحافره الانفاق بينما الطماطم المزروعة مع الحلبه اعطت اصابة عالية بحافرة الانفاق.

زيت النيم وزيت القطن والحلبه افضل المعاملات لمكافحة حشرة المن يتبعها الكافور (. (والصابون في منطقتي شمبات وكرري في موسم 2007/2008

إختبار اصابة ثمار الطماطم بالعفن القمي في منطقة كرري دلت التجارب علي أن معامليتي زيت النيم وزيت القطن اعطت نتائج جيدة في مكافحة المرض . بينما لم تلاحظ الاصابة في منطقة شمبات.

تمت مقارنة بين الشتول التي تنمو في ضوء الشمس والشتول التي تنمو في الظل بعد 20 يوم من نموها في المشتل حيث دلت النتائج علي أن الشتول التي تنمو في ضوء الشمس افضل من التي تنمو في الظل .

معاملات الرش اعطت انتاجية جيدة تتراوح ما بين (117.36-160.00) طن / للفدان اعطيت بواسطة الحرجل والصابون بالترتيب، م قارن بمعاملات الزراعة البينية حيث اظهرت انتاجية اقل تتراوح ما بين (93.60-113.52) طن / للفدان والتي اعطيت بواسطة القرص والكافور بالترتيب.

اخيراً تشير النتائج الي أن افضل إنتاجية طماطم كانت في موسم (2006/2007) في منطقة شمبات. ومعاملة الحرجل قد أعطت افضل انتاجية للطماطم والتي تتراوح ما بين (42.24 - 160.00) طن / للفدان بينما الكافور اعطي اقل انتاجية (40.56 - 93.60) طن / للفدان.