

**Soil Technologies Corp.**  
**Research and Development Department**



## **Research Report**

**Title:** Efficacy of Natural Control Methods of Tomato Leafminer (*Tuta Absoluta*)

**Location:** Tunisia

**Principal Investigators:** Dr. Mohamed Braham, Regional Center for Research in Horticulture and Organic Agriculture of Chott-Meriem, Tunisia

**Crop:** Tomato (variety: Chourouk)

**Date:** 2009

### **Abstract:**

The purpose of this trial was to evaluate the efficacy of various natural pesticides in the treatment of tomato leafminer, *Tuta absoluta* in greenhouse grown tomato plants. The following treatments were evaluated: Armorex<sup>1</sup>, Konflic<sup>2</sup>, Kaolin<sup>3</sup>, Tracer<sup>4</sup>, Ec-Neem<sup>5</sup>, Prevam<sup>6</sup>, Deffort<sup>7</sup>, and Temoin<sup>8</sup>. Three days after the application of each product, tomato plants were evaluated for the number of dead and alive larvae present on leaves. Armorex had the highest efficacy including the average percent death rate across all trials.

<sup>1</sup>Armorex is a minimum risk pesticide manufactured by Soil Technologies Corp. in Fairfield, IA USA <sup>2</sup>Konflic is a natural pesticide manufactured by Atlantica Agricultura Natural

<sup>3</sup>Kaolin is a mineral compound CAS # 1332-58-7

<sup>4</sup>Tracer is a group 5 insecticide EPA Reg. No. 62719-267

<sup>5</sup>Ec-Neem is a natural pesticide

<sup>6</sup>Prevam is a broad spectrum insecticide EPA Reg. No. 72662-3

<sup>7</sup>Deffort is a natural pesticide produced by Altinco Agro <sup>8</sup>Temoin is a natural pesticide

**Methods:**

Tomato plants were planted November 23, 2009 in the Organic Greenhouse Sahline Monastery in a 550 m<sup>2</sup> area containing soil composed of 20% silt, 40% clay and 40% sand. The following treatments were evaluated at a dosage rate of 6 cc/L of water: Armorex<sup>1</sup>, Konflic<sup>2</sup>, Kaolin<sup>3</sup>, Tracer<sup>4</sup>, Ec Neem<sup>5</sup>, Prevam<sup>6</sup>, Deffort<sup>7</sup>, and Temoin<sup>8</sup>. Three days after the application of each product, tomato plants were evaluated for the number of dead and alive larvae present. Larvae stages that were tested in this trial (L1, L2-L3, and L4) are depicted in the photograph to the right.



L1



L2-L3

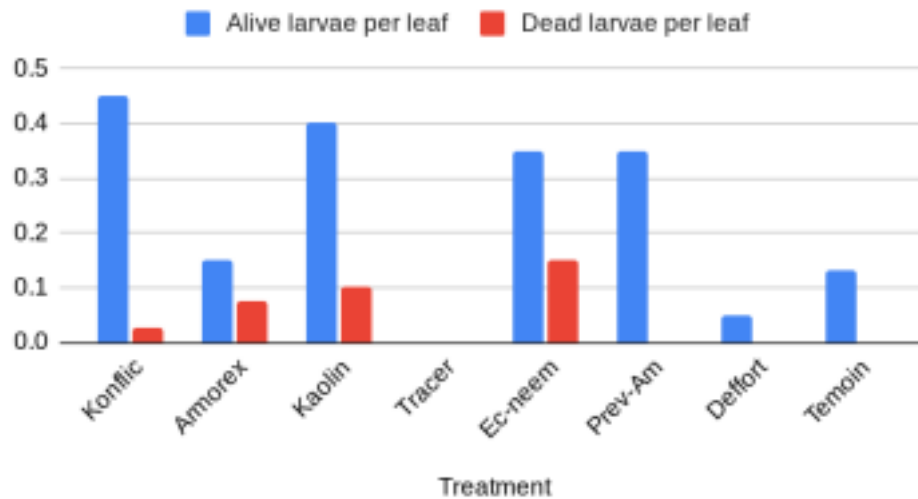


L4

**Results:**

The graphs below depict the effect of natural pesticides on larvae number, three days after treatment took place on March 29, 2010 and April 8, 2010.

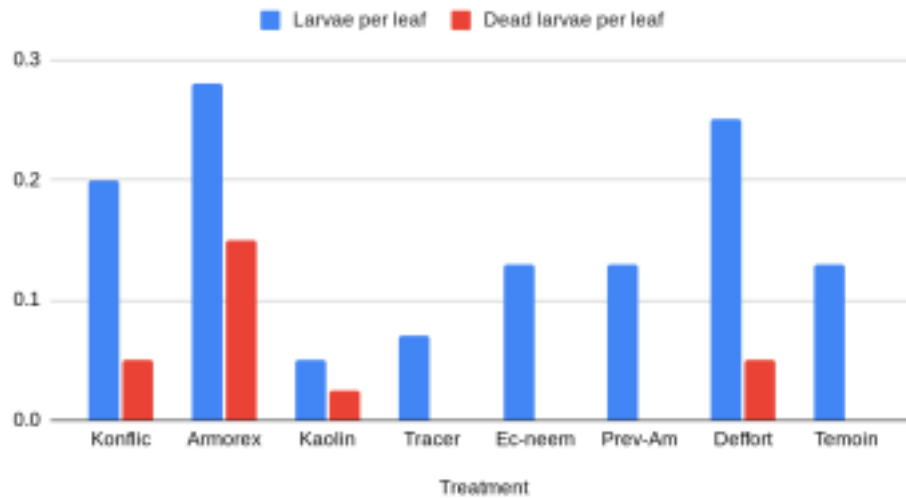
Number of L1, L2 and L3 Larvae 3/29/2010



Graph 1: Living and Dead Larva (L1, L2, L3) After First Application

The Graph 1 depicts the numbers of L1, L2, and L3 larvae (average number per leaf) counted three days after the application of treatments. Ec-neem had the highest death count while Amorex had the highest death rate.

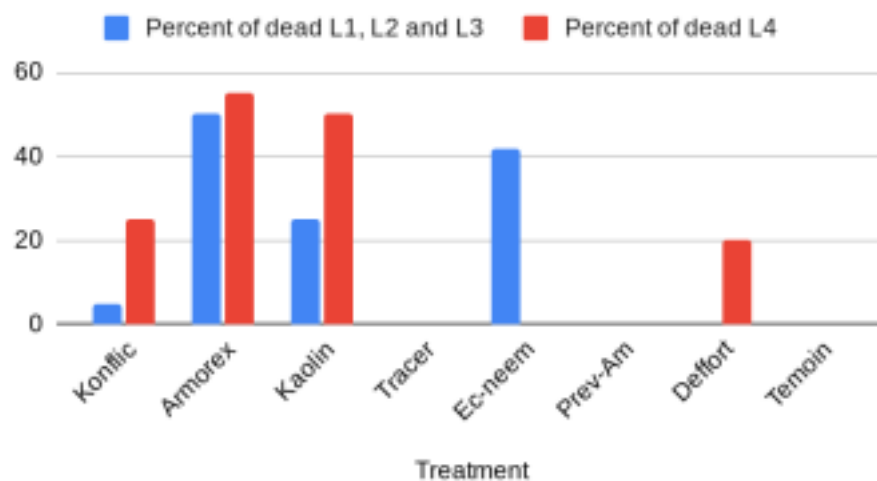
Number of L4 Larvae 3/29/2010



Graph 2: Living and Dead Larva (L4) After First Application

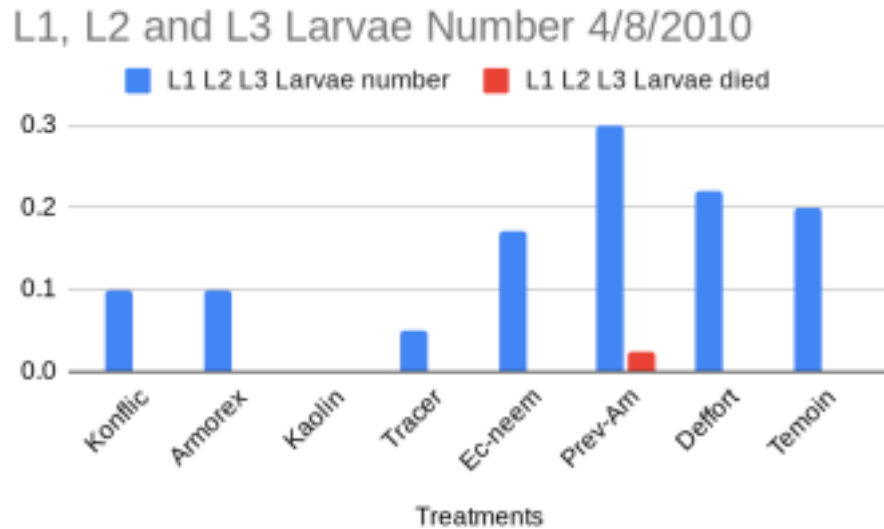
Graph 2 shows the average number of L4 larvae per leaf by treatment observed three days after application of treatments. Armorex had the highest death count and death rate.

Percent of Dead Larvae 3/29/2010



Graph 3: Percent Death After First Application

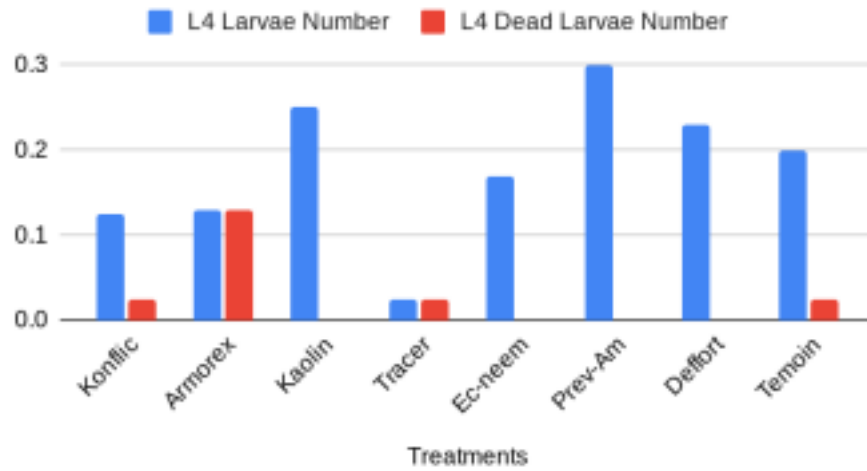
Graph 3, above demonstrates the percent of dead larvae observed three days after treatment on March 29, 2010. Tomato plants treated with Armorex had the highest percent of dead larvae out of all treatments. Armorex treated plants resulted in a 50% death rate of L1, L2 and L3 larvae and a 55% death rate in L4 larvae. Kaolin provided the second highest death rate of 50% in L4 larvae.



Graph 4: Living and Dead Larva (L1, L2, L3) After Second Application

The graph above demonstrates the number of L1, L2, and L3 larvae three days after the application of treatments on April 8, 2010. Prev-Am treated plants had the highest count of larvae followed by Delfort and Temoin. Prev-Am also had the highest count of dead larvae. Graph 5 shows the results for the number of L4 larvae per treatment three days after the application of treatments. Plants treated with Armorex had the highest number of dead L4 larvae and highest death rate.

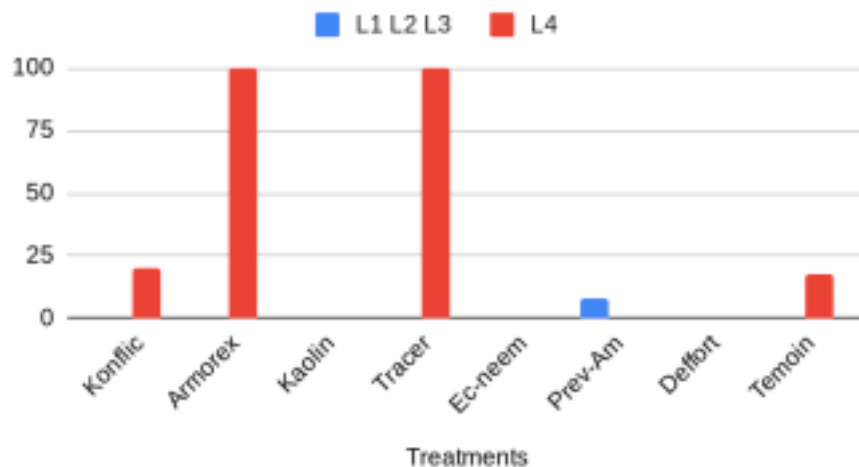
L4 Larvae Numbers 4/8/2010



Graph 5: Living and Dead Larva (L4) After First Application

The graph below represents the results in percent of dead larvae. Armorex performed the best by achieving a 100% death rate in L4 larvae with an average number of alive larvae of 0.13 per leaf. Tracer treated plants also obtained a 100% death rate but had a lesser infestation of L4 larvae of 0.025 larvae per leaf.

Percent of Dead Larvae 4/8/2010



Graph 6: Percent of Larva Death After Second Application

Chart 1 below, shows the percent death rates and an average across all trials.

	Percent Death by Treatment				
	3/29/2010 Results		4/28/2010 Results		Average
	L1, L2, L3	L4	L1, L2, L3	L4	
Konflic	5%	25%	0%	20%	13%
Armorex	50%	55%	0%	100%	51%
Kaolin	25%	50%	0%	0%	19%
Tracer	0%	0%	0%	100%	25%
Ec neem	42%	0%	0%	0%	11%
Prev-Am	0%	0%	8%	0%	2%
Deffort	0%	20%	0%	0%	5%
Temoin	0%	0%	0%	18%	5%

Chart 1: Larva Death Rate Percents

**Conclusions:**

In conclusion, the results from this study indicate that Armorex performed the best in controlling tomato leafminer larvae compared to the other treatments. Results taken from the first round of application indicate that Armorex treated plants had the highest mortality rates for all larvae stages and results from the second application of treatments show a 100% death rate for L4 larvae.