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# The biological efficiencies of the synthetic pyretroids on Egyptian cotton leafworm (Spodoptera littoralis Boisd.)

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## Summary

The contact and the residual efficiencies of three syntethic pyretroids were found out on Egyptian cotton leafworm (**S.littoralis**) under field conditions in Serik (Antalya).

In the trial Decis (2.5 gr a.i/decar), Ripcord (10 gr a.i/decar) and Imperator (7.5 gr a.i/decar) were included.

The contact effectivenesses of all three compounds were found out 100 per cent in twenty minutes after spraying, while the residual effectivenesses were rather changeable. The best one was Decis and Ripcord followed it. Fifth day after spraying very sharp decrease in the residual efficiencies were obvious. Although Decis was the best, none of the compounds seemed to be as long residual effect as it had been claimed by various sources.

## Introduction

For the last two years, in the field on plant protection a new group of chemicals, which are the syntethic pyretroids, has been spoken about and noticed as a new weapon in chemical control by various sources in Turkey.

Low mammalian toxicity and low rate of application with very broad spectrum are the main features of this new group of chemicals.

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The residual effectivenesses of them on various pests is an long as twenty days according to different sources and technical data sheets.

Two different compounds of this group were introduced to Turkish cotton market officially for the control of Bollworm (**Heliothis** spp.) and White fly (**Bemisia tabaci** Genn.) in 1978.

These compounds are: Decametryn (trade name decis) and Cypermetryn (trade names ripcord and imperator).

This study was carried out with those above mentioned products to find out their biological efficiencies (contact and residual) on **S.littoralis** which is also very important pest in the southern region of the country.

**Material and method**

The variety of cotton included in the trial was Carolina queen. The field was located in Karadayı village of Serik (Antalya). The equipment was a calibrated solo atomizer.

The larvae used in the trial were obtained from egg masses collected from the vicinity. Each egg masses was maintained in an ice-cream box (18 x 13 x 6 cm.) for hatching. After hatching the larvae were also kept in the same boxes by feeding with the choped egg-plants.

The plot size for each treatment was taken as 10 x 20 : 200 $m^2$. The treatments included in the trial has been shown in table 1.

Table — 1
General knowledge about the treatments

| Number | Chemical name | Trade name | a.i(%) | dosage/decar (a.i.) |
|---|---|---|---|---|
| 1 | Decametryn | Decis | 2.5 | 2.5 |
| 2 | Cypermetryn | Ripcord | 20.0 | 10.0 |
| 3 | Cypermetryn | Imperator | 25.0 | 7.5 |
| 4 | Control | — | — | — |

The determination of the contact effectiveness

The distribution of the characters among the plots were done randomly. Just before spraying of each plot with the designated treatment, three ice-cream boxes each including 20 larvae without any food (7 second, 7 third and 6 fourth stage larvae) were set up in the plot at reasonable distance from each other. Then, the plot was treated without taking the presence of those boxes into consideration so that they could have their own share of the product. When the spraying was over, those boxes were taken away from the treated plot to the untreated part of the cotton field for observation.

The determination of the residual effectiveness

Twenty minutes after spraying of each plot, randomly chosen five cotton leaves were picked out and put into ice-cream box. Twenty larvae, the same as above mentioned, were introduced to this food. Then, the box was covered with a piece of muslin. So way, three replications were performed for each treated plot. Only one replication was included from the check plot.

In every 24 hours each box was opened and alive and dead larvae were counted. After this work food and larvae were renewed. The procedure continued so way.

The biological effectiveness was calculated according to Abbott formula.

**Results and discussion**

The contact effectivenesses of all the products included in the trial resulted in 100 per cent of larval dead in 20 minutes after spraying as it can be seen in table 2.

Table — 2

The contact effectivenesses of the products

| The product | % of dead larvae 20 minutes after spraying |
|---|---|
| Decis | 100 |
| Ripcord | 100 |
| Imperator | 100 |

The results of the counts and the residual efficiencies of the characters are shown in table 3 and 4.

Table — 3

The results of alive larval counts after spraying

| Treatment | Repl. | 1.day | 2.day | 3.day | 4.day | 5.day | 6.day | 7.day |
|---|---|---|---|---|---|---|---|---|
| Decis | I- | 0 | 0 | 1 | 1 | 6 | 10 | 17 |
| | II- | 0 | 0 | 1 | 1 | 10 | 13 | 13 |
| | III- | 0 | 0 | 0 | 2 | 8 | 13 | 18 |
| Ripcord | I- | 0 | 0 | 2 | — | 8 | 14 | 16 |
| | II- | 0 | 0 | 4 | — | 9 | 14 | 20 |
| | III- | 0 | 0 | 3 | — | 7 | 12 | 16 |
| Imperator | I- | 0 | 0 | 2 | — | 12 | 16 | 20 |
| | II- | 0 | 0 | 3 | — | 14 | 15 | 20 |
| | III- | 0 | 0 | 6 | — | 10 | 15 | 12 |
| Control | I- | 19 | 20 | 20 | 20 | 20 | 20 | 20 |

Table — 4

The biological effectiveness according to Abbott formula (average)

| Treatment | 1.day | 2.day | 3.day | 4.day | 5.day | 6.day | 7.day |
|---|---|---|---|---|---|---|---|
| Decis | 100 | 100 | 96.6 | 93.3 | 60.0 | 40.0 | 20.0 |
| Ripcord | 100 | 100 | 85.0 | — | 60.0 | 33.3 | 13.3 |
| Imperator | 100 | 100 | 81.6 | — | 40.0 | 23.3 | 13.3 |

The results of this trial showed us that the initial effectiveness of the synthetic pyretroids is definitely succesful. But the residual effectiveness is not as long as it had been claimed. The existence of heavy dew on the 4 and 5.day nights may be the reason of this situation.

I have observed that the speed of dead in older larvae is quicker. Younger larvae are not so mobil as big larvae. On the other hand, older larvae feed more. For that reason, for older larvae have the chance of being subjected to poisinous area and intake of poisinous food is more than the chance of younger larvae. These habits of different stages also effect the spedity of dead.

Although the residual activity of synthetic pyretroids is not as long as it is claimed, high level of efficiency in contact action and in residual action in early days after application, they can almost eradicate the population in the field and clean up it.

## Özet

Sentetik pyretroidlerin mısır pamuk yaprak kurdu (**Spodoptera littoralis** Boisd.) larvalarına karşı biyolojik etkinliği

Özellikle son iki yıldan beri Türkiye'de, haklarında en çok konuşulan, yeni bir kimyevi grup olan sentetik pyretroidlerle mısır pamuk yaprak kurdu (**Spodoptera littoralis** Boisd.)'na karşı yapılan bu çalışma ile adı geçen gruba mensup ilaçların bu zararlıya karşı olan kontakt ve kalıcı etkileri saptanmıştır.

Denemeye alınan Decis (2.5 gr aktif/da), (Ripcord 10 gr aktif/da) ve Imperator (7.5 gr aktif/da) ilaçlarının hepside kontakt etki yönünden çok başarılı bulunmuş, yirmi dakika içinde % 100'e ulaşan ölüm meydana getirmişlerdir. Kalıcı (residual) etki yönünden en başarılı ilaç olarak Decis görülmüş, bunu Ripcord takip etmiştir. Kalıcı etkide, 4. günden sonra görülen ani düşüşlerin ağır çiğ şartlarından ileri gelmiş olması muhtemeldir.