



# STUDY OF THE EFFECTIVENESS OF THE DRUG DNOC CRYSTAL 45% S.P. UZBEKISTAN IN THE FIGHT AGAINST SCALE INSECTS ON THE APPLE TREE

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Article history:	Abstract:
<b>Received:</b> 7 <sup>th</sup> December 2025 <b>Accepted:</b> 6 <sup>th</sup> February 2026	<p>Dnok Crystal 45% pp. It turned out to be an effective means in the fight against cotton bollworm at a rate of 0.3-0.4 kg/ha on cotton crops.</p> <p>In the specified consumption rate, the drug Dnok Crystal 45% s.p. does not have a toxic effect on the growth and development of plants.</p> <p>Based on the results of the industrial field test, we believe that it is necessary to include the drug Dnok Crystal 45% s.p. in the "List of ..." of the Republic of Uzbekistan. against cotton bollworm the norm is 0.3-0.4 kg/ha on cotton crops.</p>
<b>Keywords:</b> Apple tree , species , habitat, biocenosis, natural balance, environment, gardening , Dnok Crystal 45% sp. , efficiency.	

## INTRODUCTION

At the current stage of development of agricultural production in the Republic of Uzbekistan, increasing the yield of agricultural crops, including apple trees in horticulture, is very important.

**The apple tree** (Latin: *Malus*) is a genus of deciduous trees and shrubs in the rose family (*Rosaceae*) with spherical, sweet or sour-sweet fruits. Native to the temperate climate zones of the Northern Hemisphere.

The genus belongs to the tribe Maleae . subfamily Prunoideae . Contains 62 species (2013) . The most common are: the domestic or cultivated apple tree (*Malus domestica*), which includes the majority of varieties cultivated in the world (the number of which exceeds 10 thousand) , the plum-leaved apple tree , the Chinese apple tree (*Malus prunifolia*) and the low apple tree (*Malus pumila*) .

Many apple tree species are grown as ornamental plants in gardens and parks and used in shelterbelt afforestation. All species are excellent honey producers . Apple wood is dense, strong, easy to cut and polishes well; it is suitable for turning, joinery, and small crafts.

Trees with a spreading crown, 2.5 to 15 meters tall. Branches are shortened (fruiting), where flower buds are formed, and elongated (growing). Wild species have thorns on their branches.

The leaves are petiolate, bare or pubescent below, with deciduous or persistent stipules .

In total, over ten species are known in the CIS . Of the wild species, the wild apple tree (*Malus sylvestris*) grows in the forests of the European part and the Caucasus ; the oriental apple tree (*Malus orientalis*) grows in Asia Minor , Iran , Crimea and the Caucasus ; in China, Mongolia , Primorsky Krai , and Eastern Siberia - *Malus baccata* (crown apple) ; in the Tien Shan forests – Nedzvetsky apple tree (*Malus niedzwetzkyana*) , in the vicinity of Almaty – Sievers apple tree (*Malus sieversii*) , the wild ancestor of many cultivated apple varieties.

## LITERATURE REVIEW

**The California scale** (*Quadraspidiotus perniciosus*) is an insect of the scale family. It is an agricultural pest that damages approximately 270 plant species from 85 families. The main crops it damages are apple trees , pear , apricot , quince, cherry , hawthorn , walnut , almond , peach , plum , cherry , acacia , lilac , roses , hops, etc.

The female's scutellum is 1.5–2.0 mm, round, grayish-brown or black, with two larval skins located in the center. The body is lemon-yellow, broadly oval, narrowing toward the pygidium, with a round sclerotized spot on the side of the prothorax. The male's scutellum is grayish-brown, elongated to 1.0 mm.

Scale insects damage all above-ground parts of the tree. Red spots appear on the bark (in early June) and fruit (in mid-June) 24 hours after the larvae attach. The larvae infest skeletal branches, trunk, and shoot tips, causing bark cracking and death, premature leaf fall, reduced growth, shoot curvature and drying, and ultimately, smaller and deformed fruit. Without protective measures, the thickness of the continuous layer of scale insects can sometimes reach up to 3 mm, potentially resulting in the complete death of the tree.

The first-instar larva overwinters under a black shield. The pest is highly fecund (from 50 to 400 larvae), produces a large number of generations per season (up to four or more), and damages a significant number of plant

species. These insects are highly ecologically flexible: they tolerate significant fluctuations in temperature (from -40 to -50 to +45°C) and humidity (from 30 to 90%) .

They are carried on people's clothing, shoes, tools, and planting material and wood chips. "Wanderers" crawl through branches from tree to tree, where the crowns of the trees are converging. Phytosanitary measures are aimed at preventing the importation of the pest from outbreak sites. To this end, the transportation of planting and grafting material for fruit crops, fruits, and damaged plants from areas infested by scale insects is prohibited. Upon arrival of imported planting and grafting material, a quarantine inspection is conducted. Quarantine inspections of plantings are conducted three times: in the spring during the flowering period; in the summer at the beginning of July; and in the fall in September.

The degree of damage to fruit crops varies in different geographical areas, but apple trees are the most damaged crop everywhere.

The scale insect settles in large colonies on trunks , branches , leaves and fruits . It depletes trees. This leads to cracking and dying of the bark , premature leaf fall , reduced growth and drying of shoots , and deformed and small fruits. Characteristic red spots appear on the fruits and young shoots at the sites of damage.

### PLACE AND METHODOLOGY OF THE RESEARCH

The drug Dnok Crystal 45% sp. OOO " Agro " Beck Biotech » Uzbekistan is an insecticide recommended for testing against apple tree pests. The insecticide was tested in the fields of the Large-plot Experiment at the Marulov Saidakbar farm in the Chust district of the Namangan region. The test included the test product, Dnok Crystal 45% w/w. normally 0.3-0.4 kg/ha against scale insects The drug Sulfomekh 76.3% e.e. was used as a standard. 0.5 L /ha , as well as a control variant without treatment. Spraying was carried out using a K-90 motor sprayer with a calculated spray rate of 300 L/ha. The plot size was 0,5 rathree replicates for each variant.

The treatment was carried out in the morning hours, when the temperature was no higher than 25°C and the wind speed was 1.5 m/sec. The experimental methodology, subsequent records, and calculation of biological effectiveness were carried out (Methodological guidelines ...) (2004) approved by the State Chemical Commission of the Republic of Uzbekistan. The calculation of biological effectiveness was carried out using Abbott's formula (1925).

### TEST RESULTS

Experiments on testing the drug Dnok Crystal 45% s.p. conducted Marulov Saidakbar farm, Chust district , Namangan region, in early June 2023 during the cotton growing season. Results of studies on the biological efficacy of Dnok Crystal 45% s.p. against cotton bollworm The results for the application rate of 0.3-0.4 kg/ha are presented in the table. It can be seen that at the application rate of 0.3-0.4 kg/ha, on the 7th day after treatment, the biological effectiveness against scale insects on apple trees was 87.4-90.7%. This was higher than the reference ( 84.9 %) option (Table 1). Under control, the number of pests was steadily increasing.

Thus, the results of the study show that the drug Dnok Crystal 45% s.p. at a rate of 0.3-0.4 kg/ha against cotton bollworm can be used on cotton crops.

**Table 1**

Biological efficiency of the drug Dnok Crystal 45% s.p. against scale insects on apple trees. Namangan region Chust district, farm. them. " Marulov Saidakbar " large-scale experiment, Motor, sprayer, working fluid consumption 300 l/ha, 05/20/2023.

No.	Options	Application rate of the preparation, kg/ha or l/ha	Average number of scale insects per 15 cm branch, specimens				Biological efficiency, V %				
			Before processing	After processing on the day of accounting				3	7	14	21
				3	7	14	21				
1.	Dnok Crystal 45% pp.	0, 3	31 , 2	6.1	4.4	6.5	7.8	81.9	87.4	82.0	78.9
2.	Dnok Crystal 45% pp.	0.4	30.9	5.4	3.2	5.8	7.3	83.8	90.7	83.8	80.0
3 .	Sulfomech 76.3% e.e. (standard)	0.5	31 , 5	7.4	5.3	7.6	8.8	78, 3	84.9	79.1	76.4
4.	Control (no treatment)	-	30 , 1	32 , 6	33 , 7	34 , 9	35 , 7	-	-	-	-

### CONCLUSIONS

Dnok Crystal 45% pp. It turned out to be an effective means in the fight against cotton bollworm at a rate of 0.3-0.4 kg/ha on cotton crops.

In the specified consumption rate, the drug Dnok Crystal 45% s.p. does not have a toxic effect on the growth and development of plants.

Based on the results of the industrial field test, we believe that it is necessary to include the drug Dnok Crystal 45% s.p. in the "List of ..." of the Republic of Uzbekistan. against cotton bollworm the norm is 0.3-0.4 kg/ha on cotton crops.

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