

**PROTECTION STRAWBERRY AGAINST WHITE SPOT AND
INDICATORS CROP YIELDS AND QUALITY IN THE NORTHERN
FOREST-STEPPE (RIGHT BANK) ZONE OF UKRAINE**

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Presented of influencing of systems of protection of strawberry against a white spotted on crop yields, marketable yield and disease development in the Northern (right bank) zone of Ukraine. The proposed system of protection of strawberries showed reduced intensity of disease from 13,21 to 24,34%, increased the number and quality of the yield.

***Key words:** gardening strawberry, marketable yield, cultivar, crop yield, white spotted, disease intensity, protecting system.*

Growing fruits strawberry necessarily accompanied by definition marketable quality yield - sorted by marketable brands by berry size, degree of ripeness, mechanical damage, damage insects and diseases lesions [6, 12].

Among the many diseases of strawberry white spots are the most widespread and harmful, which cause disruption of physiological processes, the common weakening of shrubs and lower crop yields in the current and next year, the deterioration of its quality [4, 13]. Pathogen attacks the leaves, petioles, flower stalks, runners, fruit calyces and berries [8, 14]. According to information of many researchers reduction of crop yield from the disease up to 30% [1, 5, 8].

Today, integrated pest management for berry no reliable information about the influence of the disease on crop yield and quality of berries, and the purpose of

our research was to study these questions for create of an efficient system of protection plantations of strawberries against a white spotted.

Materials and methods. The investigation was conducted at the Institute pomology by name LP Symyrenko of the NAAS of Ukraine in 2006-2008.

The soil in the experimental plots was typical black soil humus light loam on loess with physicochemical parameters: the 0-20 cm layer containing 2.9% of soil humus, 21-40 cm - 2.1% (by Tyurin), pH of salt extract – 6,7; the base absorption sum - 21 mg.-equiv./100 g of soil, mobile compounds of phosphorus – 29,7, mobile compounds of potassium – 18,7.

The object of the research is strawberry cultivars with different susceptibility to disease: highly susceptible to white spotted Senga Sengana, susceptible Honeoye and moderately susceptible – Kent. These cultivars in regional research are relative resistance to other diseases. Experiment was planted in August 28, 2005 by fresh seedling first reproduction of stem diameter 8-12 mm. The scheme of planting at a spacing of 90X20 cm.

Disease intensity was determined visually by a careful survey of strawberry leaves. Number of account leaf 50 in each variant, number of replications – 4. Variants of the experiment were designed in random blocks. Area of experimental field 0,6 ha. The prevalence of the disease was defined on each variant by a scale proposed by Y.V. Kalyuzhniy and accounting by fitopathologists formulas [7, 9, 10]:

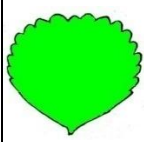
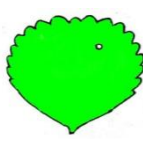
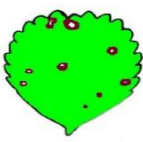
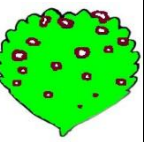
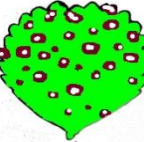
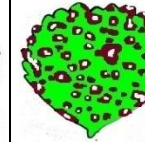
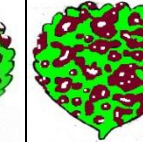
Scheme of the experiment: 1. Control (without apply fungicides). 2. Generally: Bordeaux mixture, 3%, chorus, 75% w.g. (0,7 kg/ha), bordeaux mixture, 1%. 3. Proposed system: blue bordo, 77% w.g. (3 kg / ha); topsin-m, 70% w.p. (1 kg/ha); medyan extra 35% s.c. (3 l/ha).

Spraying above preparations were applied into account peculiarities of the etiology of the disease in the researches years: the first phase of parasitism period coincided with the beginning spreads conidia and continued from the first to the third decade of April (from 5 to 23 April), the second period falls on a moment of intense spreads of conidia of the pathogen *R. tulasnei* Sacc. and first symptoms of disease on leaves of strawberry, from the second decade of April to the second decade of May, taking into with the phase of the longer flower stalks of mid and late strawberry

cultivars. The maximum intensity of disease in July and early August - the third phase of parasitism period.

Definition of damage leaves by white spot was performed for scale proposed Y.V Kalyuzhny are present in Table 1.

1. Scale to measure the intensity of white spot lesions strawberries

Візуальні ознаки							
Disease intensity, score	0	0,1	1	2	3	4	5
Influence of leaf surface, %	Absent	to 1 Minor	2-10 Weak	11-25 Average	26-50 Intense	51-75 Very intense	76-100 Total

Phenological observation of plant growth and calculation crop yield of strawberry accounting performed by the method I.A Lobanov [11]. Marketable fruits were determined during their harvest agreeably with the requirements NSTU - 01.1-37-167-2004, sorted the berries of two marketable varieties – I and II [2].

Statistical processing of the results of field experiments determined using analysis of variance by the method B.A. Dosp'yehova [3] and by the package of programs "Microsoft office 2007, Exel, Anova".

Results of experiment. Data of table 2 and figure 1, 2 and 3 show that at the damage strawberry by white spotting reduced crop yield and quality of berries. The lowest rate disease intensity and the largest rate crop yield searches strawberry cultivars was obtained at the proposed by us protection system. In particular, in cultivar Honeoye disease intensity was 4,14%, that is 15,69% less than the control. Crop yield this cultivar was 2,3 t/ha, or 30,6% higher than in controls and 1,4 t/ha, or 18,6% higher compared with the generally protection system. The difference between the variants in marketable quality yield was small.

Disease intensity in a cultivar Senga Sengana on average years of research in the control variant was 39,14%, which compared with the proposed by us protection

system at 24,34% above that positively influenced by the number and quality of the yield.

The proposed by us protection system influenced on crop yield and was an average 12,2 t/ha, that on 4,2 t/ha, or 52,5% more than in the control and 0,6 t/ha higher compared with the generally protection system. Berries 2nd marketable variety was 34,0% less compared with the control.

2. White spot intensity on different for resistant strawberry cultivars depending to the protection system (average for 2006-2008)

Immunological group of variety	Variant	Intensity of disease, %
Kent (moderately susceptible)	Control (without apply fungicides)	16,38
	Generally protection system	5,30
	Proposed by us protection system	3,17
LSD₀₅		2,28
Honeoye (susceptible)	Control (without apply fungicides)	19,83
	Generally protection system	6,66
	Proposed by us protection system	4,14
LSD₀₅		4,44
Senga Sengana (highly susceptible)	Control (without apply fungicides)	39,14
	Generally protection system	17,44
	Proposed by us protection system	14,80
LSD₀₅		5,97

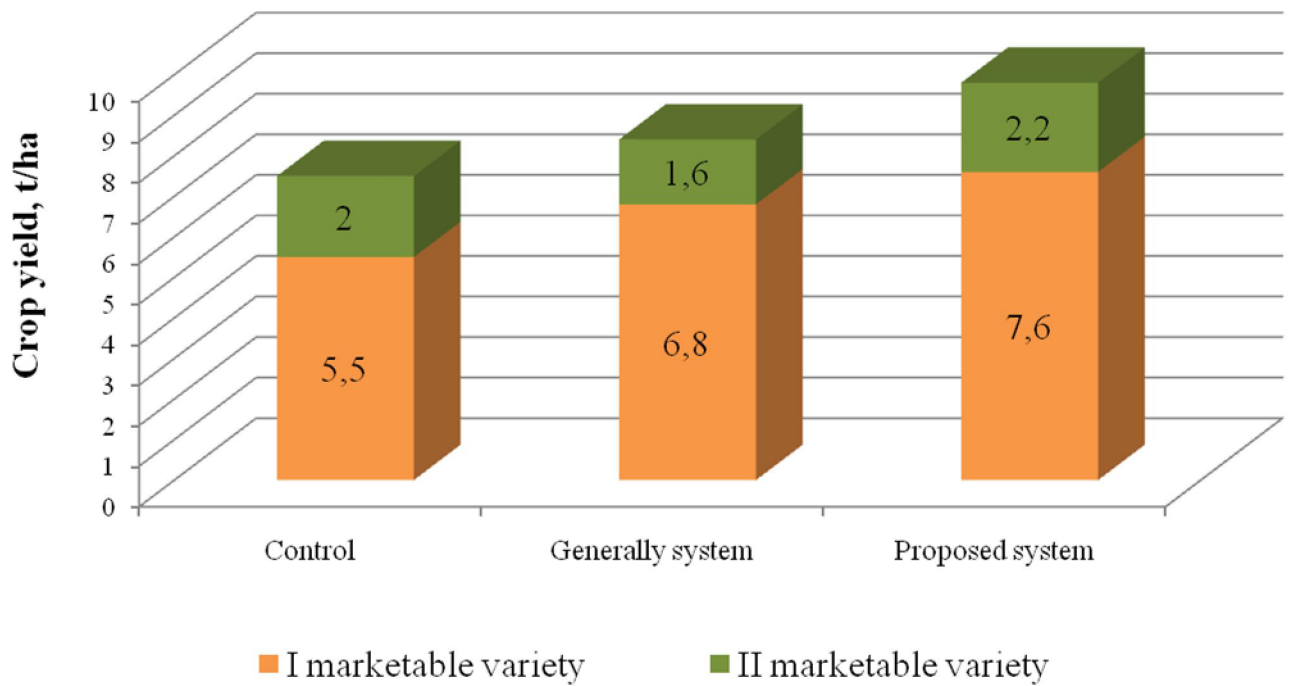


Figure. 1. Crop yield and marketability of strawberry cultivar Honeoye depending to the protection systems (average for 2006-2008)

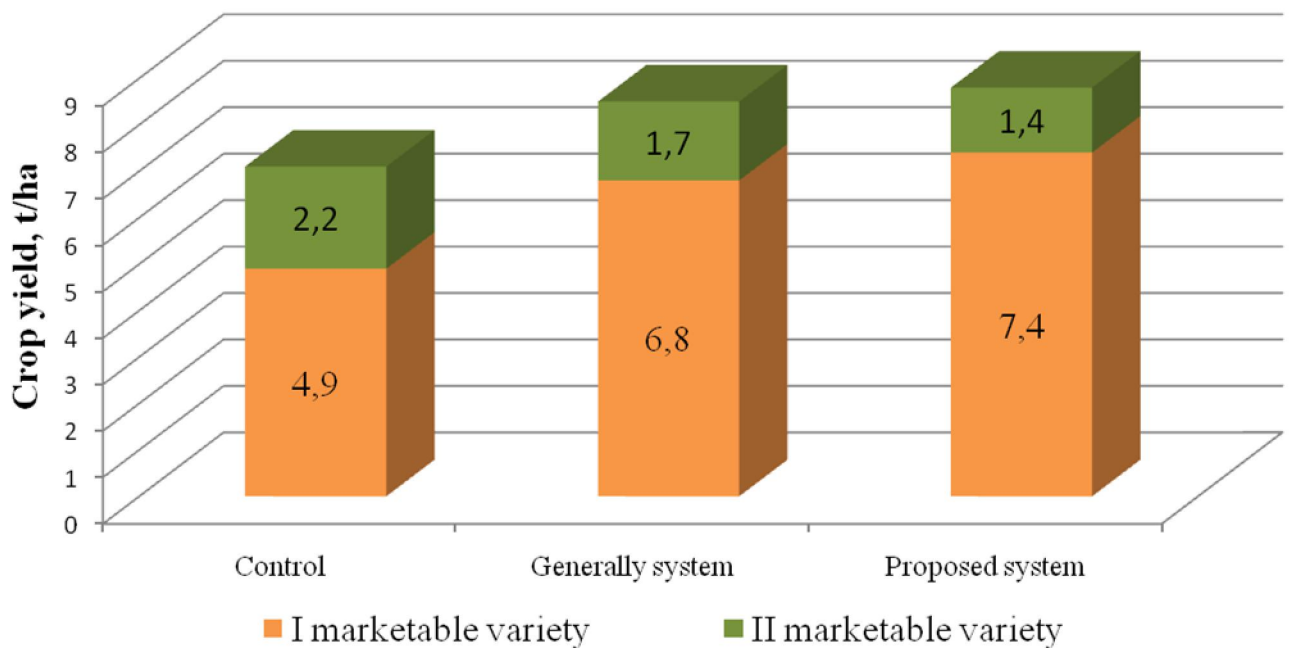


Figure. 2. Crop yield and marketability of strawberry cultivar Kent depending to the protection systems (average for 2006-2008)

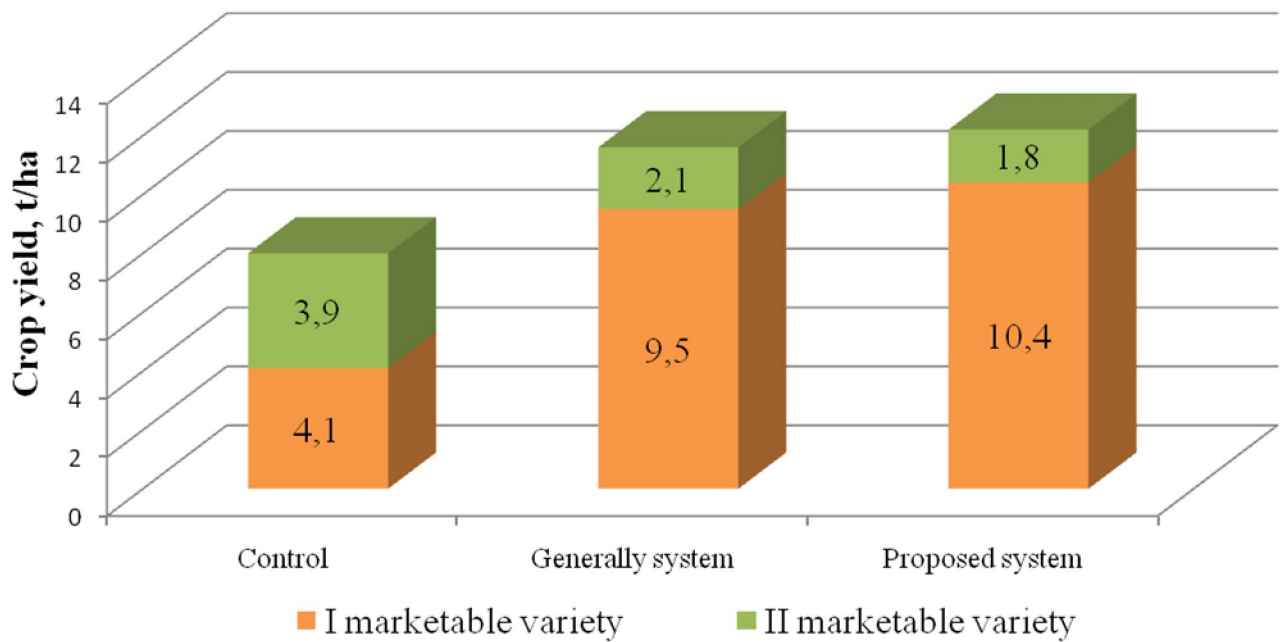


Figure. 3. Crop yield and marketability of strawberry cultivar Senga Sengana depending to the protection systems (average for 2006-2008)

In moderately susceptible cultivar Kent disease intensity in years of research was 16,63%, while the variant where applied a new (proposed) protection system – 3,17%. The crop yield on the control was 7,1 t/ha, compared with the proposed system and generally was lower respectively by 1,7 and 1,4 t/ha, berries of the 2nd marketable variety was 15 and 11% less.

CONCLUSIONS

White spot is a widespread and harmful disease of strawberries in the area of research (northern forest-steppe (right bank)). In industrial and household plantations seen significant damage pathogen *R.tulasnei* Sacc. Susceptible cultivars of strawberries without proper protection system showed low productivity and resistance to disease, namely the reduction of crop yield 1,7- 4,2 t/ha and marketable quality berries. Applying of the proposed protection system reduced the disease intensity 13,46-24,34% and increased the quality and number of the yield strawberries.

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Защита земляники садовой от белой пятнистости и показатели урожайности и качества в Северной лесостепной (правобережной) зоне Украины

И.И. Хоменко, А.А. Русин

Показано влияние систем защиты земляники садовой от белой пятнистости в Северной лесостепной (правобережной) зоне Украины на показатели урожайности, товарности и развитие болезни. Предложенная система защиты земляники способствовала снижению показателей развития болезни на 13,21-24,34%, что повысило количество и качество собранного урожая.

Ключевые слова: земляника садовая, товарность, сорт, урожайность, белая пятнистость, развитие болезни, система защиты.

ЗАХИСТ СУНИЦІ САДОВОЇ ВІД БІЛОЇ ПЛЯМИСТОСТІ ТА ПОКАЗНИКИ ВРОЖАЙНОСТІ І ЯКОСТІ У ПІВНІЧНІЙ ЛІСОСТЕПОВІЙ (ПРАВОБЕРЕЖНІЙ) ЗОНІ УКРАЇНИ

І.І. Хоменко, О.О. Русін

Показано вплив систем захисту суниць садової від білої плямистості в Північній лісостеповій (правобережній) зоні України на показники урожайності, товарності та розвитку хвороби. Запропоновано система захисту суниць сприяла зниженню показників розвитку хвороби на 13,21-24,34%, що зумовило підвищенню кількості і якості зібраного врожаю.

Ключові слова: суниця садова, товарність, сорт, урожайність, біла плямистість, розвиток хвороби, система захисту