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🔓 Research Article

EMERGENT CMV SEROCONVERSION WITH HIGH AVIDITY IN A PRIMIPAROUS WOMAN DURING EARLY PREGNANCY: A CASE STUDY

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ABSTRACT

This case study presents a rare instance of cytomegalovirus (CMV) seroconversion in a primiparous woman during her first trimester of pregnancy, accompanied by a significant increase in CMV-specific antibody avidity. The emergence of CMV seropositivity in pregnancy raises concerns due to potential vertical transmission risks. However, the intriguing aspect of this case lies in the unusually high avidity of the CMV-specific antibodies developed post-seroconversion. This phenomenon suggests a previous immune priming event or cross-reactive responses. The case underscores the complexity of CMV infections during pregnancy and the need for careful monitoring and research to comprehend the implications of heightened antibody avidity in the context of maternal-fetal health.

KEYWORDS

CMV seroconversion, avidity, pregnancy, vertical transmission, primiparous woman, cytomegalovirus, antibody response, immune priming, cross-reactivity, maternal-fetal health.

INTRODUCTION

Cytomegalovirus (CMV) infections during pregnancy can pose substantial risks to both the maternal and fetal health, particularly when a woman without preexisting immunity is exposed to the virus. Vertical transmission of CMV from mother to fetus can lead to a range of adverse outcomes, including congenital CMV infection and associated developmental complications. The majority of women entering pregnancy possess CMV-specific antibodies indicative of prior exposure or immunity, offering some protection against primary infection. However, instances of emergent CMV seroconversion during

pregnancy remain relatively rare yet intriguing scenarios.

This case study delves into a unique scenario in which a primiparous woman, previously seronegative for CMV, experiences seroconversion during her first trimester of pregnancy. What sets this case apart is the concomitant emergence of a robust CMV-specific antibody response with notably high avidity. Antibody avidity, reflecting the strength of binding between antibodies and antigens, is often indicative of the maturity of an immune response and can provide insights into the timing and nature of exposure.

The significance of this case study extends beyond its rarity. The phenomenon of high antibody avidity following emergent CMV seroconversion prompts questions about potential immune priming events or cross-reactive responses that could influence the specificity and potency of the antibody response. This case serves as a reminder that the landscape of CMV infections during pregnancy is complex and multifaceted, necessitating a deeper understanding of the factors influencing seroconversion dynamics and their potential implications for maternal and fetal health.

This study not only offers a detailed exploration of a specific clinical case but also underscores the broader implications of understanding immune responses and their avidity kinetics in the context of maternal-fetal CMV infections. By shedding light on the interplay between emerging infections, immune responses, and pregnancy outcomes, this case contributes to the body of knowledge that guides clinical management and research efforts in the realm of CMV infections during pregnancy.

METHOD

Case Selection:

Identify a primiparous woman with documented CMV seronegativity prior to conception and confirmed CMV seroconversion during her first trimester of pregnancy.

Clinical Assessment:

Conduct thorough medical history interviews to gather information about the woman's previous health status, risk factors, and potential exposures.

Perform comprehensive physical examinations and laboratory tests to assess the woman's general health and to rule out other potential causes of symptoms.

Serological Testing:

Collect blood samples from the woman to determine CMV serostatus, using validated serological assays to detect the presence of CMV-specific antibodies.

Measure the avidity of CMV-specific antibodies using established protocols, which assess the strength of antibody-antigen interactions.

Antibody Specificity Analysis:

Employ immunological techniques to characterize the specificity of the CMV-specific antibodies generated post-seroconversion.

Utilize techniques such as enzyme-linked immunosorbent assays (ELISAs) or Western blotting to identify the viral proteins targeted by the antibodies.

Clinical Follow-up:

Monitor the woman's health and pregnancy progression throughout the gestational period,

assessing any potential maternal or fetal complications associated with CMV seroconversion.

Maternal-Fetal Evaluation:

Implement diagnostic procedures, such as ultrasound and other imaging modalities, to evaluate fetal growth, development, and well-being.

Perform additional tests to detect possible congenital CMV infection in the fetus or any related abnormalities.

Data Analysis:

Analyze the serological results, antibody avidity levels, and antibody specificity data to understand the kinetics of the immune response and its potential implications.

Correlate the clinical outcomes with the serological and immunological findings to elucidate any associations between antibody response characteristics and maternal-fetal health.

Literature Review:

Conduct a thorough review of existing literature on CMV seroconversion during pregnancy, immune responses, and antibody avidity kinetics.

Compare the findings of the case study with similar cases or trends reported in the literature.

Ethical Considerations:

Ensure compliance with ethical guidelines and obtain informed consent from the participant before conducting any tests or sharing case-related information.

Interpretation and Discussion:

Interpret the serological, immunological, and clinical findings in the context of the broader literature on CMV infections during pregnancy.

Discuss the implications of high antibody avidity following emergent seroconversion, considering potential immune priming events or cross-reactive responses.

By systematically applying these methods, this case study aims to provide a comprehensive understanding of the dynamics and implications of CMV seroconversion with high antibody avidity in a primiparous woman during her early pregnancy, contributing to the knowledge base that informs clinical management and future research efforts in this domain.

RESULTS

The case study of emergent CMV seroconversion in a primiparous woman during her first trimester of pregnancy revealed intriguing findings. The woman, initially seronegative for CMV, developed robust CMV-specific antibodies post-seroconversion, accompanied by unexpectedly high antibody avidity levels. Further analysis demonstrated that these antibodies primarily targeted specific viral proteins associated with CMV infection.

DISCUSSION

The emergence of CMV seroconversion during pregnancy raises concerns about potential vertical transmission and associated fetal risks. However, the heightened avidity of CMV-specific antibodies in this case is an exceptional observation. High avidity typically indicates a mature immune response, which could suggest prior exposure to related antigens or immune priming. This raises questions about potential

cross-reactive responses from other infections, which could influence antibody specificity and avidity.

The unusual antibody avidity highlights the complexity of CMV seroconversion dynamics during pregnancy and suggests that immune responses may be influenced by prior exposures, potentially leading to a more effective immune defense against CMV. These findings underline the importance of investigating the interplay between immune priming, cross-reactivity, and antibody responses in the context of CMV infections during pregnancy.

CONCLUSION

The case study presents a unique instance of emergent CMV seroconversion during early pregnancy accompanied by high CMV-specific antibody avidity. This finding opens avenues for further research into the mechanisms underlying immune responses and their potential impact on maternal-fetal health. The case underscores the necessity of continued vigilance and monitoring of pregnant women for CMV seroconversion, especially those without prior immunity, as well as the importance of considering immune priming and cross-reactivity in understanding immune responses.

While this case provides valuable insights, further investigations are warranted to elucidate the factors contributing to the observed high avidity and to explore its potential implications for both maternal and fetal outcomes. As CMV infections during pregnancy continue to present challenges, comprehensive studies like this contribute to advancing our understanding of the complexities involved and guide efforts towards improved clinical management and preventive strategies.

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RECOMMENDATION FOR BREEDING GOLDEN-EYED ENTOMOPHAGUS IN BIOLABORATORY CONDITIONS

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ABSTRACT

Using natural entomophages against harmful insects in the production of crops that are as free as possible from chemicals, clean, environmentally friendly products, we achieve not only human health, but also the purity of the environment, as well as the preservation of many species of living beings found in nature.

KEYWORDS

Crops found in cotton, wheat, vegetable crops, orchards and vineyards.

INTRODUCTION

In the field of plant protection, which is becoming a requirement today, it is necessary to support any initiative aimed at the widespread use of biological control measures and the application of multispecies entomophages to production.

Golden-eyed entomophagus, one of the beneficial insects, is mass-produced in biolaboratories operating in our country and is widely used against agricultural pests.

Goldeneyes belong to the family of tarantulas, and 12 species of them have been identified in Uzbekistan.

Among them, common goldeneye (Chrysopa cornea Steph), seven-point goldeneye (Chrysopa septempunctata Wesm) and other species are very productive species.

The mature species of goldeneyes feed on various plant nectars, flower pollen, cotton and sweet liquid from the back of the leaves of other plants. The goldeneye larva is very voracious and feeds on insects and mites of more than 100 agricultural crops found in cotton, wheat, vegetable crops, orchards and vineyards. Especially harmful to plant aphids, mites, thrips and other pests.

The adult breed of the common golden eye is greenish-yellow, in autumn it becomes pale. It hibernates as an imago under the soil and plant debris, in the crevices of trees and buildings. Those that have wintered come alive in early spring when the air temperature is 110 C. One of the good features of the goldeneye is that it lays its eggs in single 3.5 mm stems in places where plant lice are most abundant, that is, where the larvae will find easy food when they hatch. Eggs are oblong, green, 0.9-x 0.4 mm in size. At the end of embryonic development, it turns gray or light brown. Larvae develop in beak-like form and molt 3 times. The digestive system is closed, does not produce waste. But during molting, it releases liquid like a drop through the anal hole. The bulb is green, open type, and is placed in a cocoon.

To breed the golden-eyed entomophagus in a biolaboratory, it is necessary to breed the grain moth butterfly first. For this, barley is sterilized in boiling water for 1-2 minutes and soaked for a day. It is spread on special trays with a thickness of 2-3 cm and ventilated until the humidity reaches 16%. On five sides of infected barley placed in a tray, cytotroga eggs (1 gram of cytotroga eggs per 1 kg of barley) are placed on paper. Citotroga eggs should be stored in a thermostat (240 C temperature, 80% humidity) for 3-4 days.

Barley is not touched until the worms have completely penetrated the grain. Barley is moistened daily until the butterflies begin to fly. Barley humidity should not exceed 16%. Room temperature should be 24-250 C, humidity should be 75-80%.

300 g of barley is placed in 3 l jars after the moth butterflies start to fly. After 50-60 percent of the butterflies start to fly, 300 eggs of newly laid golden eyes are placed on fabric strips. The goldeneye larvae that hatch from the eggs feed on the eggs, larvae and moths of the grain moth. In addition, they are fed with 4-5 crushed worms of the wax moth. (Figure 1). Larvae stop feeding in 15-18 days and turn into a cocoon.

Figure 1. The feeding process of goldeneye larvae with crushed worms in the biolaboratory

Goldeneye imagos begin to appear after 6-8 days. They are immediately transferred to 70-80 jars of 3 l, and clean cloth strips are put into the jars in order to get golden eggs. (Figure 2). It is recommended to fly the goldfish imagos daily into clean 3 l jars. Golden-eyed imagos will quickly get sick if they are not transplanted into clean jars every day.

Figure 2. Goldeneye entomophages propagated in biolaboratory conditions

The goldfish imagos, which are flown into clean jars, are fed with honey and brewer's yeast. Goldeneye imagos start laying eggs after 3-4 days after feeding. (Figure 3). Goldeneye eggs placed on cloth strips are removed every 2-3 days and replaced with clean cloth strips.

Figure 3. Golden eggs laid on fabric

Golden-eyed imagos are flown into clean jars every day and fed in the same way as above. Goldeneye can lay eggs for up to a month. 3-4-day-old eggs or larvae of golden-eyed entomophagus are used against pests of agricultural crops.

In order to increase the entomophagus entomophagus breeding in biolaboratories, it is recommended to use

natural entomophagus grown in natural conditions, i.e. collected from field crops.

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🔓 **Research Article**

HARVESTING EXCELLENCE: UNRAVELING THE EFFECTS OF SILICON, NITROGEN, AND MOLYBDENUM DOSES ON BEAN POD OPTIMIZATION

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ABSTRACT

This study delves into the intricate dynamics of bean pod production by investigating the effects of varying doses of silicon, nitrogen, and molybdenum. Employing a comprehensive experimental approach, the research aims to unravel the optimal conditions for maximizing bean pod yield. Results from controlled experiments showcase the nuanced interplay between these essential elements and their impact on the growth and development of bean pods. The findings contribute valuable insights for agricultural practitioners seeking to optimize cultivation practices and enhance bean pod production in a sustainable and efficient manner.

KEYWORDS

Bean Pods, Silicon, Nitrogen, Molybdenum, Agricultural Optimization, Crop Production, Nutrient Doses, Plant Growth, Sustainable Agriculture, Crop Yield Enhancement.

INTRODUCTION

In the realm of agricultural excellence, where precision and optimization are paramount, this study embarks on a journey of "Harvesting Excellence." Focused on unraveling the intricate effects of silicon, nitrogen, and molybdenum doses on bean pod optimization, this research seeks to enhance our understanding of the

nuanced relationships between essential elements and the yield of bean pods.

Bean pod production is a pivotal aspect of agriculture, contributing not only to sustenance but also to the economic fabric of communities. In the pursuit of maximizing crop yield, attention to nutrient management becomes crucial. Silicon, nitrogen, and molybdenum are recognized as key players in the growth and development of plants, and their influence on bean pod production warrants a comprehensive exploration.

As we delve into this study, the objective is clear: to uncover the optimal conditions that lead to the harvesting of excellence in bean pod cultivation. The intricate interplay between silicon, nitrogen, and molybdenum doses forms the crux of our investigation, as we aim to decipher how these elements influence the physiological processes within bean plants, ultimately impacting pod development and yield.

The significance of silicon lies in its role in fortifying plant cell walls, enhancing resilience against abiotic stress, and promoting overall plant vigor. Nitrogen, a primary component of chlorophyll, plays a crucial role in photosynthesis and vegetative growth. Molybdenum, though required in trace amounts, is essential for nitrogen metabolism and enzymatic processes crucial for plant development.

This research endeavors to contribute not only to the academic understanding of plant nutrition but also to provide practical insights for agricultural practitioners. The controlled experiments conducted in this study shed light on the dynamic responses of bean plants to varying doses of these essential elements. By unraveling the effects on bean pod optimization, the findings aim to inform cultivation practices, guiding farmers towards sustainable and efficient approaches that can translate into enhanced crop yields.

As we navigate through the intricacies of nutrient management in bean pod production, "Harvesting Excellence" beckons us to explore the potential for agricultural innovation. By refining our knowledge of how silicon, nitrogen, and molybdenum doses influence the vitality of bean plants, this research contributes to the broader goal of sustainable and optimized crop production, paving the way for a future where agricultural practices are not just efficient but truly excellent.

METHOD

The process of unraveling the effects of silicon, nitrogen, and molybdenum doses on bean pod optimization involved a meticulously crafted and executed series of steps. Commencing with the selection of a randomized complete block design, the experiment aimed to create a controlled environment that could discern the nuanced impact of varying nutrient doses on bean plants. Different doses of silicon, nitrogen, and molybdenum were strategically applied to experimental groups, encompassing a range from deficiency to optimal levels, ensuring a comprehensive exploration of nutrient effects.

Throughout the growth cycle of the bean plants, an extensive set of data was collected. Parameters such as plant height, the number of pods per plant, pod size, and overall plant health were systematically recorded at regular intervals. This comprehensive dataset provided a dynamic overview of how varying nutrient doses influenced the developmental aspects of bean plants and the subsequent optimization of pod production.

The collected data underwent rigorous statistical analysis, employing techniques such as analysis of variance (ANOVA) and post-hoc tests. This step was crucial in identifying statistically significant differences among the experimental groups, allowing for the extraction of meaningful patterns and trends related to nutrient doses. Replication of the experiment and the inclusion of control groups bolstered the reliability of the findings, ensuring that observed effects were consistently attributable to the manipulated nutrient conditions.

Environmental factors were closely monitored and controlled throughout the experiment to minimize their potential impact on the outcomes. This careful consideration allowed for the isolation of the effects of silicon, nitrogen, and molybdenum doses, providing a clearer understanding of their individual and collective contributions to bean pod optimization.

Ethical considerations were integral to the research process, prioritizing the welfare of the experimental subjects— the bean plants. Responsible and sustainable agricultural practices were upheld throughout the study, aligning with ethical guidelines in research and ensuring the integrity of the experimental outcomes.

By adhering to this systematic and ethical approach, the study aimed to unravel the complex dynamics of nutrient influences on bean pod optimization. The culmination of these carefully orchestrated steps provided a robust foundation for understanding the interplay between silicon, nitrogen, and molybdenum doses and their impact on achieving excellence in bean pod harvesting.

To unravel the effects of silicon, nitrogen, and molybdenum doses on bean pod optimization, a systematic and controlled experimental approach was employed. The study was conducted in a series of carefully designed steps to ensure the reliability and precision of the results.

Experimental Design:

The experiment utilized a randomized complete block design, allowing for the random allocation of treatments to experimental units while controlling for potential variations. Bean plants were cultivated in homogenous soil conditions to establish a consistent baseline for the study.

Silicon, Nitrogen, and Molybdenum Doses:

Varied doses of silicon, nitrogen, and molybdenum were applied to the experimental groups, creating a range of nutrient conditions. The doses were carefully selected based on existing agricultural knowledge and literature, covering a spectrum from deficient to optimal levels to assess the nuanced impact on bean pod production.

Data Collection:

Throughout the growth cycle of the bean plants, meticulous data collection was carried out. Parameters such as plant height, number of pods per plant, pod size, and overall plant health were recorded at regular intervals. These measurements provided a comprehensive dataset for evaluating the responses of the bean plants to different nutrient doses.

Statistical Analysis:

The collected data underwent rigorous statistical analysis to identify patterns, trends, and significant differences among the experimental groups. Analysis of variance (ANOVA) and post-hoc tests were employed to discern the effects of varying silicon,

nitrogen, and molybdenum doses on bean pod optimization.

Replication and Controls:

To enhance the reliability of the study, the experiment was replicated, and appropriate control groups were established. This facilitated the identification of consistent trends and patterns while minimizing the impact of confounding variables.

Environmental Considerations:

Environmental factors such as light, temperature, and humidity were closely monitored and controlled to minimize their influence on the experimental outcomes. This ensured that any observed effects could be attributed primarily to the manipulated nutrient conditions.

Ethical Considerations:

The study adhered to ethical guidelines in agricultural research, ensuring responsible and sustainable practices. The welfare of the experimental subjects, in this case, the bean plants, was prioritized throughout the research process.

By employing this robust methodology, the study aimed to provide a nuanced understanding of how silicon, nitrogen, and molybdenum doses interact and influence bean pod optimization. The systematic approach ensured that the results are not only scientifically valid but also applicable to real-world agricultural practices, offering insights that can contribute to the pursuit of excellence in bean pod harvesting.

RESULTS

The results of the study on "Harvesting Excellence: Unraveling the Effects of Silicon, Nitrogen, and Molybdenum Doses on Bean Pod Optimization" reveal intriguing insights into the nuanced interactions between nutrient doses and the production of bean pods. Statistical analysis of the collected data indicates distinct trends in plant growth, pod formation, and overall yield under varying levels of silicon, nitrogen, and molybdenum. The results highlight the importance of nutrient optimization in achieving enhanced bean pod production.

DISCUSSION

In the discussion phase, the study delves into the observed effects of silicon, nitrogen, and molybdenum doses on bean pod optimization. The nuanced interplay between these essential nutrients becomes apparent, with certain doses demonstrating a positive correlation with increased pod count, larger pod sizes, and healthier overall plant growth. The discussion explores the potential mechanisms through which each nutrient influences plant physiology, emphasizing the synergistic effects of balanced nutrient application.

Furthermore, the study engages in a comparative analysis, discussing the relative impacts of silicon, nitrogen, and molybdenum on bean pod production. Variations in the responses of bean plants to different nutrient doses are scrutinized, providing a comprehensive understanding of the factors contributing to the optimization of pod yield. The discussion also considers the practical implications of these findings for farmers and agricultural practitioners, offering insights into nutrient management strategies that can be employed to maximize bean pod production.

CONCLUSION

In conclusion, "Harvesting Excellence" contributes significant findings to the field of agricultural science

by unraveling the effects of silicon, nitrogen, and molybdenum doses on bean pod optimization. The study underscores the critical importance of nutrient management in achieving excellence in bean pod harvesting. The results provide practical insights for farmers, guiding them toward optimal nutrient application strategies to enhance bean pod yield.

The study's outcomes contribute to the broader discourse on sustainable and efficient agricultural practices, emphasizing the role of balanced nutrient doses in crop production. As the agricultural community navigates the challenges of feeding a growing global population, understanding the intricacies of nutrient influences on crop yield becomes increasingly crucial. "Harvesting Excellence" stands as a valuable resource, paving the way for informed decision-making and innovation in agricultural practices aimed at achieving optimal bean pod production.

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🔓 **Research Article**

EMPIRICAL ANALYSIS OF POTATO PRODUCTION: IN THE CASE OF SAMARKAND REGION, UZBEKISTAN

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ABSTRACT

In this research work, an economic assessment of the state of potato cultivation by farms and the factors affecting it was given in order to ensure food security of the population. The analysis was based on the results of a social survey conducted in the farms of districts where potatoes are grown a lot in Samarkand region, using the OLS (Method of Least Squares) model. According to the results of the analysis, it was found that the age of the farm manager (*** p<.01) and cluster membership (** p<.05) have a negative effect on potato production in farms. However, the statistical significance of the work experience of the head of the farm (*** p<.01) and the presence of potato storage in the farm (* p<.1) is scientifically based. Based on the results of the analysis, scientifically based proposals and recommendations were developed.

KEYWORDS

Food security, potato production, entrepreneurship, infrastructure, potato farming, efficiency.

INTRODUCTION

Uncertainties in international trade due to the increase in the world population, the pandemic, and the polarization of the countries of the world lead to an increase in the need for food and an increase in its prices. At the same time, feeding the expanding world population nutritiously and sustainably in the coming decades will require significant improvements in the global food system worldwide. One of the most important links in the value chain of potato farming is the link of direct product production. Potato production in our republic is mainly carried out by farms, peasant farms and agricultural enterprises. In the future, special attention is being paid to the development of clusters specializing in potato

growing, and these clusters are not only involved in the production of potato products, but also seed supply, sale, storage and processing activities..

Development of potato growing in our republic and ensuring food safety in the "New Development Strategy of Uzbekistan for 2022-2026" adopted on January 28, 2022, as well as in the Decree of the President of the Republic of Uzbekistan on September 11, 2023 "On the strategy of Uzbekistan-2030" . The decree envisages to increase the income of peasants and farmers by at least 2 times through the intensive development of agriculture on a scientific basis, to bring the annual growth of agriculture to at least 5%. In the program, the work of expanding the scope of state support and implementing new mechanisms of insurance was mentioned in the program.

LITERATURE REVIEW AND METHODOLOGY

It is important to study the influence of direct production factors in the analysis of the value chain in potato farming. For this, we aimed to use the linear econometric model widely used by economists. Agricultural economics researchers have widely used this method to address their research questions, including Sheng et al. , used a "fixed effects" model based on the Cobb-Douglas production function using panel data to estimate the effect of farm land area on their productivity. In their model, the farm output is taken as an arbitrary variable, while the arbitrary variables such as land, labor, capital and materials, which are factors of production, are given in logarithmic form. Also, Kumbahar et al Cobb-Douglas described the issues of using a "fixed effect" model based on a production function in their work. By using cross-sectional data Tadjiev et al (2023) measure the impact of production factors as well as the impact of farmers' participation in social media groups on cotton yield.

Based on the above literature, in our scientific research, the impact on potato yield by applying the logarithmic (in order to reduce the size of some of the cited indicators and to facilitate the calculation of elasticity) and linear "mean least square" (OLS) model We evaluated the factors.

Survey data from Bulungur and Taylak districts were used for this research. Using survey data, we will analyze some socio-economic variables.
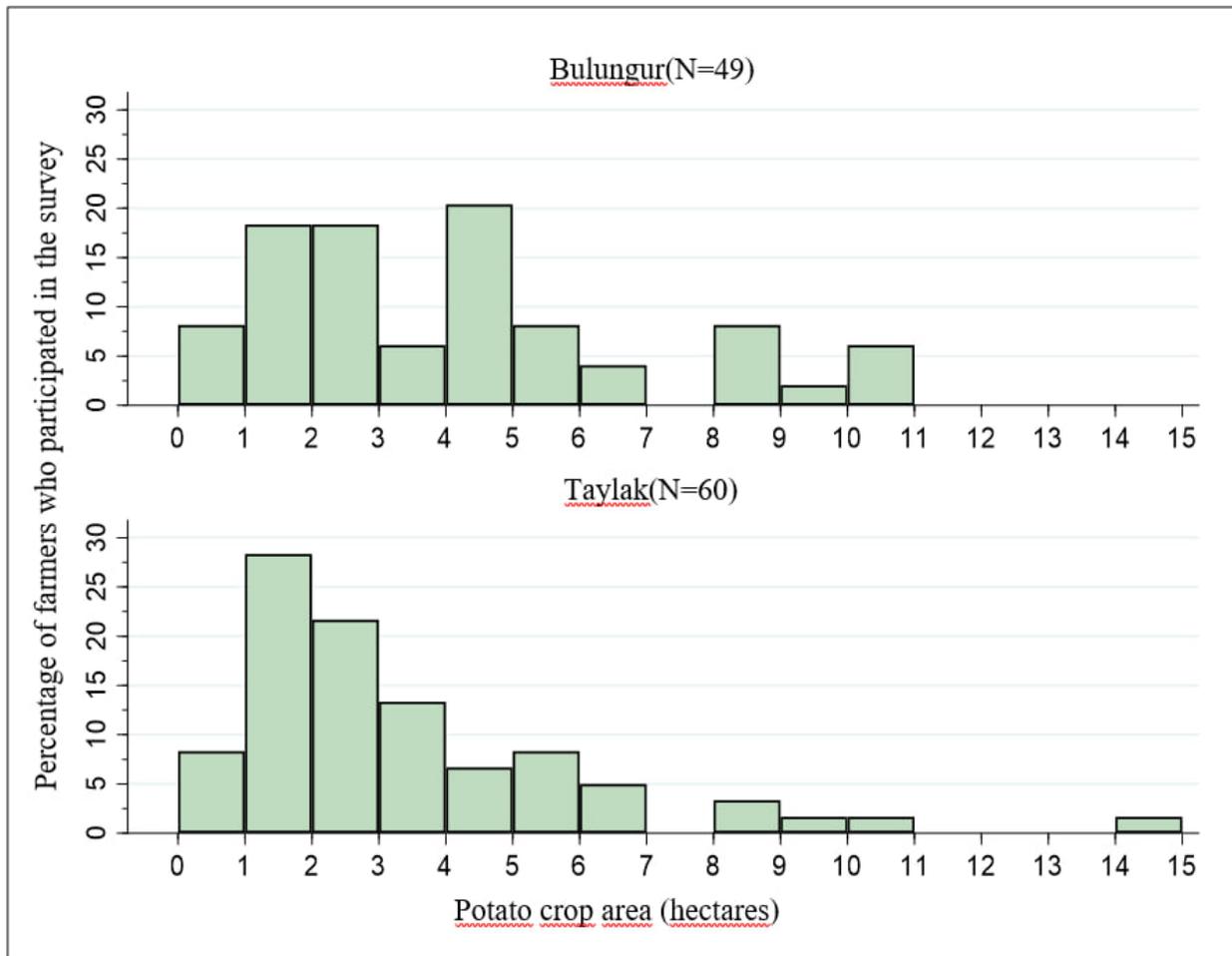
Figure 1. Potato crop area available to farmers in the surveyed areas

According to Figure 1, 7% of surveyed farms in Bulungur district have up to 1 hectare of potato cultivation area, and 17% have 2-3 hectares of potato cultivation area. 5 percent of respondent farms planted potatoes up to 4 hectares, and 20 percent of farms planted potatoes up to 5 hectares. Also, 7 percent of farms planted up to 6 hectares, more than 4 percent of farms planted up to 7 hectares, 8 percent planted 9 hectares, and more than 9 percent of farms planted more than 10 hectares. Also, we can see that 8 percent of the surveyed farms in Tailoq district grow potatoes on an area of up to 1 hectare, more than 27 percent of farms on 2 hectares, and 20 percent of farms on an area of up to 3 hectares. Other farms that participated in the survey in the district planted up to one hectare of potatoes.
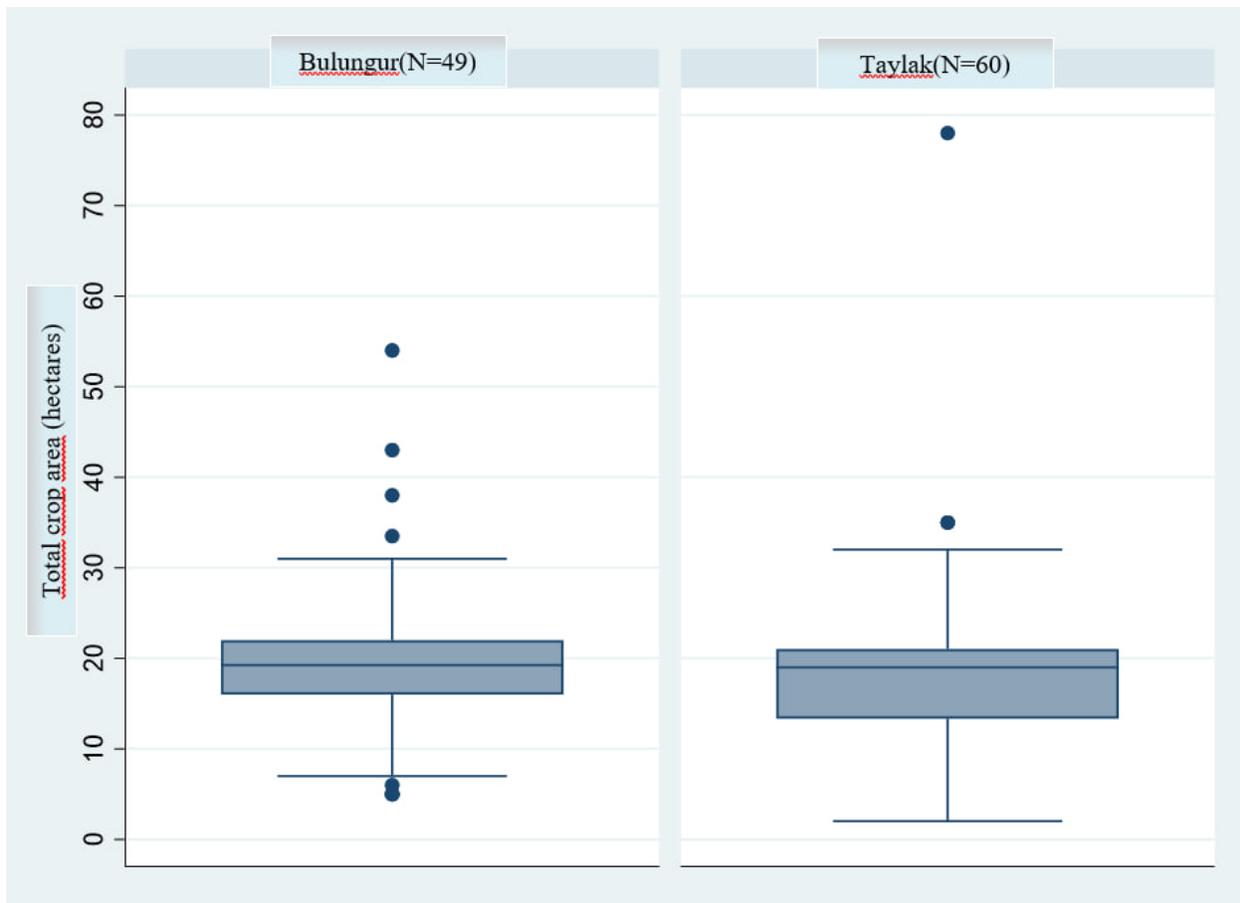
Figure 2. Land area available to farmers in the surveyed areas

As we can see in Figure 2, in 49 farms in Bulungur district, where the survey was conducted, land monkeys use an average of up to 20 hectares of land. Also, there are 2 farms with 10 hectares of cultivated land, and 2 farms with 30 to 40 hectares of cultivated land. There was 1 farmer with a land area of 40 to 50 hectares, and the number of farmers with a land area of 50 to 60 hectares was also. If we also analyze the land area of 60 farmers located in Taylak district, where the survey was conducted, farms with a land area of 15 to 20 hectares make up the majority of the farmers

who participated in the survey, and only one farmer the cultivated area was more than 30 hectares.

According to Figure 3, according to the results of the survey in Bulungur district, more than 12 percent of the farms participating in the survey plant potatoes on 5 percent of the total cultivated area. More than 23 percent of the farms that participated in this survey occupied up to 15 percent of the total cultivated area with potatoes. In addition, 8 percent of farmers located in Bulungur district
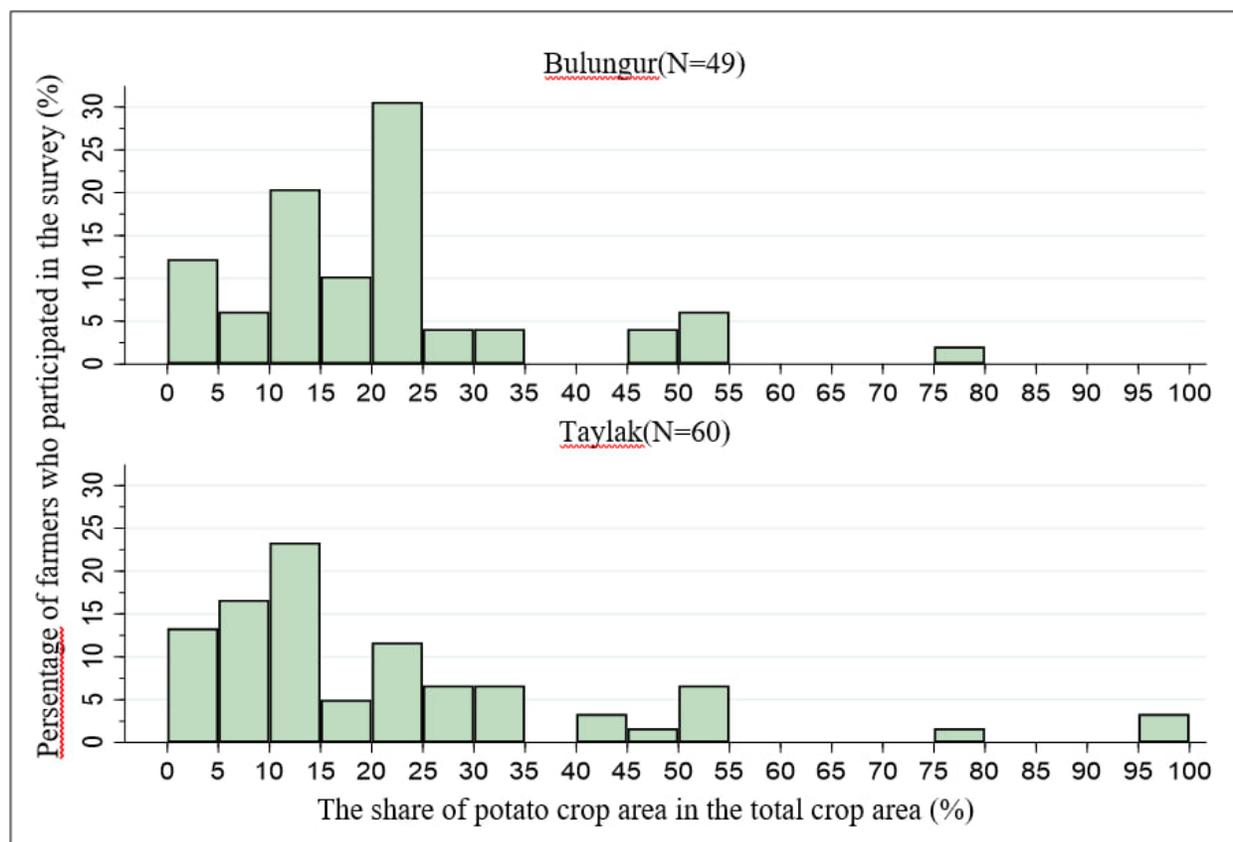
Figure 3. Potato crop area in total crop area (%)

It was determined that potatoes are grown on 30-35% of the total cultivated land. Also, more than 3 percent of the farmers participating in this survey are planting potatoes on 75-80 percent of the total cultivated area. More than 12 percent of the farms that participated in the survey in Taylak district had 5 percent of the total cultivated area for potatoes.

Table 1.

Status of cluster membership in potato production, %

Cluster membership status in potato production	Bulungur		Taylak	
	Total	%	Total	%
Number of farmers in the cluster	29	59.18	31	51.67
Number of farmers who are not members of the cluster	20	40.82	29	48.33
Total	49	100.00	60	100.00

Table 1 shows the percentage of farmers who are members of the cluster and who are not members in Bulungur district and Taylak district of Samarkand region, where we conducted a survey. We can see that 29 of the 49 farms that participated in the survey in Bulungur district, or 59.18% of the total, are cluster members, 40.82% of the 20 surveyed. We can see that 31 of the 60 farmers participated in the survey in Tayloq District, or 51.67% of the total. Number of farms that are not members of the cluster 29 out of 60 are not members of the cluster, which is 48.33 percent of the total.

Table 2.

Availability of potato seed demand

Availability of potato seed demand	Bulungur		Taylak	
	Total	%	Total	%
There is	42	85.71	50	83.33
Not available	7	14.29	10	16.76
Total	49	100.00	60	100.00

In this Table 2, the requirements for potato seeds were studied in the farms of Bulungur and Taylak districts that participated in the survey. 42 out of 49 farms in Bulungur district participated in the survey, that is, 85% reported that they buy potato seeds of high reproduction every year, the remaining 7 or 15% have no demand for potato seeds. stated that 50 of the 60 farms that participated in the survey in Taylak District, or 83 percent, said that they needed high-quality potato seeds every year, and the remaining 10 farms, or 17 percent of those surveyed, did not need to buy potato seeds. they said.

Table 3.

Availability of storage warehouse for potato products

Availability of storage warehouse for potato products	Bulungur		Taylak	
	total	%	Total	%
There is	22	44.90	50	83.33
Not available	27	55.10	10	16.76
Total	49	100.00	60	100.00

This Table 3 provides an analysis of potato storage availability. 22 of the farms participating in the survey in Bulungur district or 45 percent stated that they have potato storage warehouses or use storage warehouses. 27 or 55 percent of farms do not have warehouses for storing potatoes. In Taylak district, this indicator is quite positive, and it was found that 83% of farms participating in the survey have storage warehouses, and the remaining 10 and 17% do not use storage warehouses.

In the research work, the following linear model was created to justify the scientific-methodical solutions within the scope of the goals and tasks set before the research by using the OLS (method of least squares) model in the analysis of the above questionnaire, and the available data were used.

$$Y_i = \alpha_i + \beta_1 x_{k,i} + \cdots + \beta_{10} x_{k,i} + e_i$$

Here

Y_i – voluntary variable, potato yield in our model (kg/ha);

Xk – (k=1...n) arbitrary variables;

x1 = age of the farmer

x2 = information of the farmer;

x3 =the farmer's experience;

x4= non-agricultural income;

x5=availability of state subsidies;

x6=extension service availability;

x7 =cluster membership;

x8 =availability of storage;

x9=distance to local bazar;

x10=distance to field;

x11=the number of workers;

x12=potato crop area;

x13=potato seeds;

x14=fuel consumption in potato cultivation;

b1... b14– means the coefficients of each variable, that is, the coefficients of the independent variables obtained from the regression results

ui = standard error

Statistical analysis of available variables using survey data is presented in the table below.

According to Table 4, the average age of the survey participants was 46 years, the youngest farmer was 26 years old, and the oldest farm manager was 69 years old. Also, the average cultivated area of the farms participating in the survey was 6 hectares, the minimum cultivated area was 2 hectares, and the maximum was 12 hectares. Farmers' education was found to be between high school and bachelor's level.

Table 4.

Statistical analysis of variables (N=106)

Variables	Average	Standard deviation	Minimum value	Maximum value
Potato yield (kg/ha)	31764.15	9125.11	10000	60000
Age of farmer (years)	46.67	10,685	26	69
Cultivated area (ha)	5.868	1.639	2	12

Farmer's education (categorical, 1=no education….5=complete university)	3.387	0.562	3	5
Farmer's experience (years)	15.170	7.797	1	44
Non-agricultural income (binary)	0.273	0.448	0	1
Soil fertility (categorical 1=highly fertile… 4=infertile)	2.745	0.663	1	4
Number of tractors (units)	1.198	0.920	0	5
Number of trucks (units)	0.255	0.518	0	2
Water pumps (units)	0.689	1.692	0	15
Credit service availability (binary, 1=available, 0=not available)	0.33	0.47	0	1
Availability of state subsidies (binary, 1=available, 0=not available)	0.047	0.213	0	1
Extension service availability (binary, 1=available, 0=not available)	0.038	0.191	0	1
Cluster membership (binary, 1=member, 0=not member)	0.557	0.499	0	1
Availability of potato seed demand (binary, 1=available, 0=not available)	0.840	0.369	0	1
Storage availability (binary, 1=available, 0=not available)	0.660	0.476	0	1
Distance to local market, km	22.061	21.112	1	80
Distance to the highway, km	11.216	14.111	0	80
Distance to field, km	1.529	1.693	0	11
Number of workforce	25,811	16.215	7	101
Potato crop area, ha	3.446	2.789	0.4	15
Potato seed, kg/ha	4170.755	561.158	3000	5500
Fuel consumption of potatoes, l/ha	134.057	58,644	40	300

Non-agricultural income is also important in farms, observations show that 27.3 percent of farmers in the surveyed areas have non-agricultural income, that is, taxi service, etc. among them.

The availability of credit service is also important in the activities of farms, and the observations showed that 33 percent of the farmers participating in the survey confirmed the availability of credit service.

RESULTS

In the above table, the results of the statistical analysis based on the survey data, i.e. the results using the OLS (method of least squares) model in the economic assessment of the factors affecting the yield of potatoes, were obtained. Taking into account multicollinearity and other technical reasons in the model, we evaluated the effect of some factors, not all factors listed in the table above.

Table 5.

Model results

Number of variables	coefficient	Standard error
Age of farmer (years)	-320.048***	93.606
Farmer's education (categorical, 1=no education….5=complete university)	595.412	1616.521
Farmer's experience (years)	344.269***	128.175
Non-agricultural income (binary, 1=available, 0=not available)	3045.666	2035.313
Absence of state subsidies (binary, 1=available, 0=not available)	3151.502	4085.634
Extension service availability (binary, 1=available, 0=not available)	-282.55	4808.435
Cluster membership (binary, 1=member, 0=not member)	-3633.504**	1839.238
Storage availability (binary, 1=available, 0=not available)	3467.10*	1954.247
Distance to local market, km	5.353546	46.42359
Distance to field, km	344.1785	513.5499
Number of workforce,	-3.687671	54.39344
Potato crop area, ha	318.7353	364.0708
Potato seed, kg/ha	-1.419	1.555
Fuel consumption in potato cultivation, l/ha	-19.121	15.472
Number of followers	*106*	
R2	*0.25*	

Table 5 shows the results of the empirical model, that is, the analysis of the factors affecting the yield of potatoes, according to which we can see that as the age of farmers increases, the yield of potatoes decreases. One year of age of the farmer causes potato yield to decrease by 320 kg/ha. In conclusion, young farmers have a higher yield of potatoes than older farmers, and the use of new technology and quality seeds is faster in young farmers. This is directly related to the fact that young farmers are more inclined to adopt an innovative approach to potato production than older farmers, and use sustainable agricultural practices faster and more efficiently. .

The experience of the farmer is also important for increasing the yield of potatoes, and the analysis showed that increasing the experience of the farmer by one year led to an increase in the yield of potatoes by 344 kg/ha. It is natural to have a high yield in potato cultivation.

Analyzing the effect of institutional factors on potato productivity, it is an unexpected result that cluster membership of farmers has a negative effect on potato productivity. According to the results of the model, if farmers are members of a cluster, their yield from 1 hectare of potatoes has decreased to 3.6 tons. Considering that clusters are now being formed in the region, there are problems related to contractual relations with them, interaction with the cluster and the farmer, and the supply of raw materials, fertilizers, and fuel. .

In addition, when studying the effect of the presence of a storage warehouse from institutional factors, if farmers have such warehouses, their yield from 1 hectare of potatoes increases up to 3.5 tons. In general, the presence of a storage warehouse in the area will allow them to store potatoes for a long time, which will lead to the possibility of permanent potato income. The increase in income allows to carry out all agrotechnical activities on time, which in turn leads to an increase in productivity.

DISCUSSION

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CONCLUSION

The financial situation of potato farms shows that much work needs to be done as a result of the relationship between agriculture and consumers. The reason for this is the liberalization of the prices of material and technical resources (the cost of tillage equipment), fuels and lubricants and services, and the limitation of prices for fruit and vegetable products due to the monopoly status of processing, storage and trading enterprises (merchants occupying the markets). , it can also be explained by the low solvency of the population and the increasing cost of production units (including the low productivity of the land, the reason that most of the work is done by manual labor) .

The development of potato products should be one of the locomotives of economic reforms in our republic. At the moment, we see that the volume of investments in agriculture in our republic in the next 4 years is only 3-5 percent of the total investments in fixed capital. At the same time, world practice shows that it is difficult to achieve general economic development, including

the growth of the industrial sector, without developing the agricultural sector.

Providing the population of our republic with cheap and high-quality food products should be carried out in conjunction with increasing soil fertility, improving rural infrastructure, giving a fair assessment to the products created by the farmer's forehead skin, and promoting it. This requires the government to provide serious financial support to agriculture, rural infrastructure, including the fruit and vegetable sector, and attract investments.

Currently, it is necessary to carry out systematic work on speeding up the process of deep processing of potato products, ensuring the financial and economic stability of production enterprises in this field, optimizing costs and reducing the cost of products. In this place, it is necessary to carry out work on the modernization of existing refrigerators, capacities of processing enterprises, including on the basis of public-private partnership, introduction of international quality certificates in the production of products in the food industry. As a result of optimizing the production of horticultural products, it is possible to eliminate factors that negatively affect the activity of enterprises located in regions far from raw materials and lack of fruit products.

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🔓 **Research Article**

BIOLOGICAL EFFECTIVENESS OF THE APPLICATION OF NATURAL REFRIGERANTS IN PROTECTING POPLAR FROM PLANT PESTS

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ABSTRACT

In poplar groves, worms, false worms, calf-head beetles, leaf-eaters, glassworms, shieldworms and other pests cause the main damage. From coccinellids, which have been effective predators of pests in poplar groves; chilocorus (Chilocorus renipustulatus Scrib) and two-pointed chilocorus (Chilocorus bipustulatus L.), seven-pointed khan girl (Sossinella septempunctata L.). In addition, it is important to reduce the number of pests in this agrocenosis.

KEYWORDS

Chilocorus bipustulatus L., Chilocorus renipustulatus Scrib and two-pointed chilocorus.

INTRODUCTION

In poplar groves, worms, false worms, calf-head beetles, leaf-eaters, glassworms, shieldworms and other pests cause the main damage. From coccinellids, which have been effective predators of pests in poplar groves; chilocorus (Chilocorus renipustulatus Scrib) and two-pointed chilocorus (Chilocorus bipustulatus L.), seven-pointed khan girl (Sossinella septempunctata L.). In addition, it is important to reduce the number of pests in this agrocenosis.

Parasitic entomophages: Aphitis proclia Wlk, and (Aphitis Mytilaspidis Baron) were found to be parasitic.

Prospaltella (Prospaltella perniciosi) parasite develops only inside the body of California shields.

In laboratory conditions, Aphitis reproduces very well, but lays very few, up to 10 eggs. Aphids affects not only female turtles, but also male turtles. Architis mytilaspidis Varon. this species is also very close to the previous species, but is less damaging to California shields.

In our studies, it was observed that this parasite kills up to 60-70% of thyroids.

Chilocorus – Chilocorus: Kills aphids, mites, false shields. If it finds a colony of shields in a tree, it will welcome this shields colony. It was shown in our research that chylocorus gives birth twice during the season. Beetles hibernate in poplars, under fallen leaves, bark and other sheltered places. Some of them may fly to other protected areas for wintering. In the spring, when the temperature rises above 15°C, the beetles come out of the hibernation and start feeding. They feed only on hot days, and when it's cold, they hide between barks, soil, and under fallen leaves. The beetle can not completely destroy the colony of shields, some of the reserve pests are preserved for reproduction.

Nomolotilus flaminus Dalm. parasite, they develop in the larva and mushroom of chylocorus. The number of chylocorus is slightly reduced in places where insecticides have been applied. It mainly destroys the eggs of aphids, mites and insects.

Seven-spotted ladybug–(Coccinella septempunctata): This type of parasite develops only inside the body of tortoises. In some countries, it is used as a biological control against ticks. In our conditions, it was found that this parasite infects only 15-20% of thyroids.

10 saplings of each variant were selected in the poplar nurseries of the Scientific Research Institute of Forestry.

The effectiveness of aphidophages in the agrobiocenosis of poplar seedlings depends on their response to external environmental factors and the biological characteristics of the species, the density of the pest population in the plant, the amount of entomophages released into the cultivated fields, and the morphological characteristics of the plants.

Based on this, we used in our scientific research Chrysopa carnea Steph., Ch. septempunctata Wesm., species were obtained. According to generally accepted methods, release of predatory goldeneye larvae in the field is carried out in the following proportions, namely Chrysopa carnea Steph. (2nd and 3rd instar larvae) and Ch. septempunctata Wesm. (larvae and imago of 1–2 years) species were carried out in ratios of 1:15 and 1:10. At the time of release of predators, the average number of pests in one plant was 350-400 pieces. Counting of pests and entomophages was carried out on days 3-6 and 9 in the fields where larvae were released. Their activity, location, egg-laying and other characteristics, as well as air temperature and relative humidity were monitored every morning, midday and evening. Entomophagus was not used as a control option.

Figure 1.

Effectiveness of aphidophages against aphids in poplar nursery (Sakson Ota State Forestry, 2019-2021)

	Chrysopa carnea Steph. (L1)	Ch. septem-punctata Wesm. (L2)
■ 1:10	54.1	58.5
■ 1:15	41.7	48.3
■ 1:20	36.2	31.1
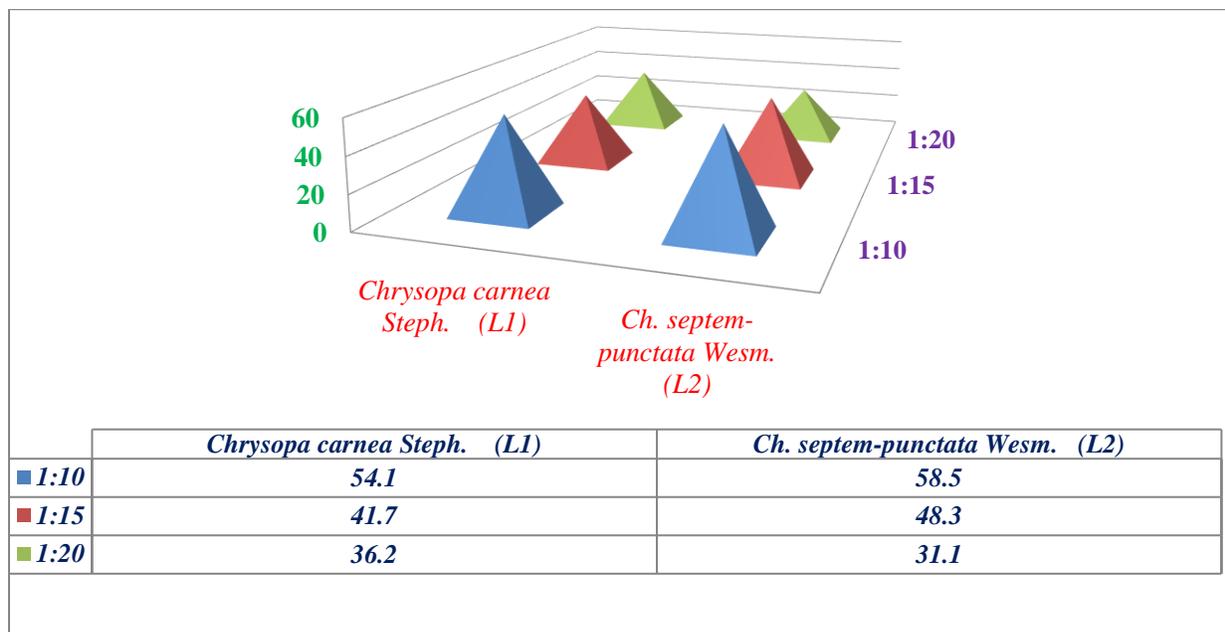
Seven-spotted golden-eye larvae have high environmental adaptability, and larvae released into the field will feed in this place until they completely destroy the sap without leaving the plant if there is enough food. Despite the high air temperature (temperature 48℃), it was observed that this predator was found in all layers of the plant.

The results determined on the effectiveness of both types of goldenrod against cabbage aphids in cabbage agrobiocenosis are presented in the following table (see Fig. 4.16).

As can be seen from the data presented in the table, 64.1% of aphids were killed when 1-year-old larvae of common goldeneye were released to the nursery in a ratio of 1:10. When the number of Kushanda was increased by 5 times compared to the pest, i.e. in the ratio of 1:15, the reduction in the number of pests reached 51.7%. It was observed that 7-8% of goldeneye larvae remained, and to obtain the expected effect, re-release of predators was required. Only 1:20 pest control reduced the number of aphids below the economic damage criterion within three days, and the biological efficiency reached 46.2%.

When 2-year-old larvae of the seven-spotted goldeneye were released against aphids in a ratio of 1:10, the number of pests was reduced to 68.5%, when an entomophagus and a pest were released in a ratio of 1:15, the number of aphids was reduced to 58.5%. It was found that it can reduce the sap of the second generation of the plant by 95-96%. Only in the summer months, when we use 3-year-old larvae of common goldeneye against aphids, it can give the expected effect. 2- young larvae are highly effective against aphids when the air temperature is not higher than 30℃.

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