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Sea buckthorn gall mite (*Aceria hippophaena* Nal.) in the orchards of sea buckthorn (*Hippophae rhamnoides* L.) and elements of its control agrotechnology

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Abstract. The presented research allowed for covering more features of new varieties of sea buckthorn, demonstrating the bio-ecological potential of their plants against damage by sea buckthorn gall mites, which is no less urgent today among the pests of sea buckthorn orchards. Thus, the species Aceria hippophaena Nalepa (synonym Eriophyes hippophaenus Nalepa), which belongs to the genus Artacris Keifer, 1970, is one of the dangerous representatives of four-legged mites towards plants of the genus Hippophae L. The purpose of the study was to explore the biological and ecological features of the above-mentioned mite and to develop measures for its control in buckthorn orchards. During the research, field and laboratory methods were used according to the methodology for conducting a qualification examination of forest plant species varieties for their suitability for distribution in Ukraine. It was established that the range of sea buckthorn gall mites covers large areas of Western, and Northwestern Europe and the northern regions of Eastern Europe, including Ukraine. In the conditions of the northern part of the Forest-Steppe of Ukraine, bioecological features and the level of damage of sea buckthorn gall mites on plants of the studied crop were explored in the gardens of early-, mid- and late-ripening varieties of sea buckthorn. It was noted that the sea buckthorn gall mite leads a hidden lifestyle, feeding inside the buds and leaves of buckthorn plants. It has been established that this parasite severely damages sea buckthorn plants in the initial stages of their ontogeny. In addition, severely damaged leaves are deformed, dry out prematurely and fall off, which frequently results in their death. It was established that the mite infestation and damage to plants of early-ripening varieties is less than that of medium- and late-ripening varieties. The practical value of the work is that it has been proven that two- or three-fold mechanised tillage in the inter-row and near-stem zone significantly reduces damage to sea buckthorn plants by gall mites

Keywords: four-legged mite, biological and ecological features, harmfulness, sea buckthorn plants, methods of pest control

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INTRODUCTION

Among the many tasks in fruit gardening, the implementation of effective measures to protect plants from unfavourable biotic environmental factors is no less important to achieve the desired effect. Notably, due to the growing relevance of fruit crops, fruit plants that are not common in culture, including buckthorn (*Hippophae rhamnoides* L.), whose yield and fruit quality are not always stable and are frequently low and of poor quality caused by pests, are becoming increasingly important. The most probable pests that reduce the productivity and quality of sea buckthorn fruit include the following species: sea buckthorn honeydew (*Psylla hippophaeana* Cl.); sea buckthorn leaf miner (*Archips hippophaeana* Heyd.); sea buckthorn borer (*Zeuzera pyrina* L.); sea buckthorn fly (*Rhagoletes batava obscuriosa* Hering); southern grey weevil (*Tanymecus dulaticollis* Gyll.), odd silkworm (*Ocneria dispar* L.), sea buckthorn gall mite (*Eriophyes hippophaeanus* Nal.) etc.

Until 2007, no targeted research on the species and structural diversity of sea buckthorn pests was conducted in Ukraine. And due to the increase in the area under sea buckthorn orchards, the level of spread and harmfulness of phytophagous insects will increase. A serious pest of the sea buckthorn garden is the sea buckthorn gall mite (*Aceria hippophaena* Nalepa), whose parasitism on host plants results in gall development, a pathological process that is expressed in the growth and change of plant tissues. The above-mentioned species of four-legged mites is one of the representatives of numerous and functionally significant components of the entomofauna of cultivated and natural cenoses. The study of gall-developing pests is of practical importance since the latter significantly affects the condition of host plants by inducing galls on them. The range of *Aceria hippophaena* Nalepa covers large areas of Western, Northwest and North-Eastern Europe, including Ukraine (Goud *et al.*, 2021; GBIF Secretariat, 2019).

Faunal research on applied acarology is of great relevance. Acarology scientists note that new species of mites are increasingly appearing in cenosis crops, which pose a threat to plants. For example, Hemmatzadeh-Khorshidabadi *et al.* (2022) note that new species of Aceria eryophyid mites have been identified on fodder plants, which they believe may worsen the condition of pasture producers. European scientists, in particular, Ripka *et al.*, (2021), have recorded three species of mites of the Aceria family that parasitise ornamental shrub species of *Salicaceae*. Other researchers (Elhalawany & Ueckermann, 2022) do not note any symptoms of damage to cultivated plants when detecting new tick species but emphasise that this is only in the initial stages of newly introduced plants.

Chinese scientists, in particular Wu *et al.* (2022), proved the harmfulness of the gall mite on goji plants. The establishment of vesicular galls, thickening and deformation of fodder crop leaves under the parasitic influence of ticks was noted by Ruan *et al.* (2021). Frequently, gall mites are accompanied both by damage to vegetative organs and generative organs, in particular, to the fruits of European olive, as noted by Sergio & Moraes (2020). The double adverse effect of ticks on plants was noted by Albrecht *et al.* (2022), which manifests itself in the deterioration of the physiological state of crops and their damage by viral diseases. According to de Almeida Paz-Neto *et al.* (2022), gall development on plant leaves caused by mites provides shelter and an abundance of other pests, including moths.

Admittedly, the parasitising efficiency of ticks on cultivated plants depends on weather and climatic conditions and human economic activity. Changing temperature conditions, as noted by Karpicka-Ignatowska *et al.* (2021), determine the number of populations of erythrophoid ticks, which transmit viruses. As for economic activity, acaricides are a deterrent to tick development. According to Revynthi *et al.* (2022), chemical control of mites is an effective and cost-efficient measure in plant care. Although scientists Elhalawany *et al.* (2021) consider it expedient to identify their biological characteristics and timely use of acarifages in the fight against gall mites. Thus, the study of biological and ecological features of sea buckthorn gall mite and the development of measures for its control in sea buckthorn orchards is an urgent task that will allow early diagnosis of this pest and timely control measures.

The purpose of the research was to explore the bioecological features of *Aceria hippophaena* Nal. and to develop measures to reduce its populations in the orchards of buckthorn.

MATERIALS AND METHODS

Observations of sea buckthorn plant damage by gall mites were conducted at the experimental plots of the Institute of Horticulture of the National Academy of Agrarian Sciences of Ukraine and its research network during 2019-2021. Sea buckthorn varieties of Ukrainian breeding were used to explore the degree of plant damage: Rannya, Morkvyana, Osoblyva and Adaptyvna. Observations and records of plants were performed in May-September according to the methods (Methodology of qualification examination..., 2016; Grynyk *et al.*, 2020). The leaves of the studied varieties were sampled twice during the growing season. In early September, 50 leaves were collected from 5 trees of each variety (10 leaves x 5 replicates). The material was collected in cloth bags. A label was attached to each sample of a particular sea buckthorn plant variety, indicating the sample number, place and time of collection. Visual inspections were performed in the basal part and on the periphery along the entire vertical of the plant crown. Each leaf sample was placed in plastic bags with the date and place of collection, and the name of the variety, and stored in a refrigerator at 3-4°C for stepwise

analysis in the laboratory. The assessment of damaged plants by gall mites was performed in points according to the percentage of leaf surfaces covered with galls: 0 points (0%) – resistant; 0.1-1.0 points (up to 1%) – relatively resistant; 2.1-3.0 (11-30%) – moderately damaged; 3.1-4.0 (31-50%) – severely damaged; 4.1-5.0 (over 50%) – very severely damaged.

The study used sources for the identification and biological characteristics of sea buckthorn gall mites (Kamali *et al.*, 2016), economic importance and distribution (Orlova-Bienkowskaja, 2016). Statistical data processing was performed using the computer program Statistica-6.0.

RESULTS AND DISCUSSION

The gall mite spreads both under the influence of abiotic factors – wind, precipitation, and biological factors – insects, birds, and anthropogenic factors. Damage to sea buckthorn by the gall mite in the northern part of the Forest-Steppe has been observed in individual plants since 2017, but, in 2020, significant outbreaks of mass reproduction were noted locally for the first time. It was established that the mite leads a hidden life, feeding inside the buds and leaves. It is particularly harmful to young, vigorously growing trees or bushes. Severely damaged leaves are deformed, dry out prematurely and fall off, which frequently results in their death (Moskalets *et al.*, 2021). In 2020, the pest infested both the leaves of some sea buckthorn varieties and the shoots, which resulted in their distortion and weakened growth. Thus, the degree of damage, dynamics and duration of infestation of young leaves by gall midge depends on the varietal characteristics of the host plant.

During the growing season of sea buckthorn plants, four-legged mites multiply very quickly. In the Northern Forest-Steppe, the peak number of gall mites reaches the end of June - beginning of July, and, depending on weather conditions, the peak number of larvae living in leaves is observed about a month later – in the second decade of August. It has been established that in hybrid sea buckthorn nurseries, gall mites are mainly spread with planting material – seedlings and cuttings. Reserves for these phytophages are wild forms of sea buckthorn, which were selected as breeding sources of economically valuable traits in the protective strips of orchards, forest belts, and fallow lands, where ticks accumulate intensively, as in shady, wind-protected habitats, where they, in turn, get from orchards.

It was established that these pests are distributed by the wind at a distance of 50 meters or more and get into new sea buckthorn plants grown from cuttings that have been treated with acaricides with rain splashes. According to the literature (Moskalets *et al.*, 2021), the sea buckthorn gall mite is microscopic (female body length 0.2-0.22 mm, male about 0.18 mm), its body is milky white, wormlike, ringed, dorsal and abdominal half-rings are the same in width, with two pairs of legs. On the underside of the body, three pairs of abdominal bristles are arranged one after the other, and at the end, there is one pair of tail bristles.

Adult females hibernate under the covering scales of the kidneys, one of which can contain from one to several thousand individuals. In early spring, during the period of bud swelling, mites begin to lay eggs in wintering areas in the galls they form. The hatching larvae feed inside the buds, as a result of which the leaves of sea buckthorn plants that have not yet opened are completely covered with gall swellings. When the first leaves bloom (at an average daily temperature of more than 9°C and an average air humidity of 75-80%), females of the new spring generation appear, which, together with old females, move to young leaves, then concentrate mainly near the central vein, make injections and drain cell sap, eventually form galls in these places, and inhibit plant growth and development. Subsequent generations establish galls on the leaves, where the females lay eggs and the larvae that hatch from them settle on young leaves and shoots. The rounded-flat, 2-8 mm long galls first become light green, then yellowish-brown or brown, and eventually blacken and dry out. In case of severe damage, the leaves can be completely covered with galls (Fig. 1).

***Figure 1**. Leaves of sea buckthorn plants of the Adaptyvna variety damaged by sea buckthorn gall mite, the experimental field of the Institute of Horticulture of the National Academy of Sciences of Ukraine, 2020*
***Source:** photo by the authors*

In the autumn (September-October), ticks move under the scales of newly established buds, where they feed for some time and remain for the winter. In a temperate or temperate continental climate, sea buckthorn

gall mite develops in 2-3 generations during the growing season of sea buckthorn plants, and this gives a signal to take preventive countermeasures in sea buckthorn breeding agrocenoses. It is known that gall mites quickly develop pesticide-resistant populations, and therefore it is necessary to alternate drugs belonging to different chemical groups.

Notably, four-legged ticks are actively destroyed by their natural enemies – predatory ticks or acarifages (*Amblyseius finlandicus* Oudemans, 1915; *Paraseiulus soleiger* Ribaga, 1904), *Phytoseiulus persimilis* (Athias-Henriot, 1957), thrips (*Scolothrips sexmaculatus* Pergande, 1891), blind bugs (*Blepharidopterus angulatus* Fallén, 1807; *Macrolophus nubilis* V. Putshkov, 1978), goldenrod (*Chrysoperla carnea* Stephens, 1836), phytopathogenic fungi (*Beauveria bassiana* (Balsamo-Crivelli), Vuillemin, 1912; *Streptomyces avermectinius* Takahashi *et al*., 2002) that cause epizootics, which should be considered when planning protective measures in sea buckthorn orchards.

Sea buckthorn gall mite (*Aceria hippophaena* or *Eryophyes hippophaenus* Nalepa, 1898) belongs to the genus *Aceria* Keifer, 1944. This pest has a spindle-shaped body of light yellow colour, which is approximately 0.25 mm long. Both adults and larvae have two pairs of limbs. The phytophage damages the buds and leaves of the plant. Tumours or swellings (galls) with a diameter of 0.5 cm appeared on the affected leaves, inside which the mites are located.

Since sea buckthorn gall mites are microscopic, about 0.25 mm long, and cannot be seen with the naked eye, it is easier to determine their presence by the galls on the plants. In this regard, studies were conducted to determine the presence of leaves with galls and to group sea buckthorn varieties by resistance to the above pest (Table 1).

Table 1. *Time of detection and recording of the presence of leaves of sea buckthorn plants with galls Eryophyes hippophaenus Nal*

No.	Variety name	Maturity group	Damaged sea buckthorn leaves (presence of galls)*									
			2019				2020				Average for 2 years	
			I decade of June		I decade of September		I decade of June		I decade of September		I decade of June	I decade of September
			%	Points	%	Points	%	Points	%	Points	%	%
1	Rannya	em	3	1.3	15	2.2	0.5	1.0	10	2.0	1.7	12.5
2	Morkvyana	mm	7	1.7	23	2.6	5.1	1.5	17	2.3	6	20.0
3	Osoblyva	lm	6	1.6	30	3.0	5.2	1.5	48	3.9	5.5	39.0
4	Adaptyvna	lm	11	2.0	33	3.1	15	2.2	56	5	13	44.5

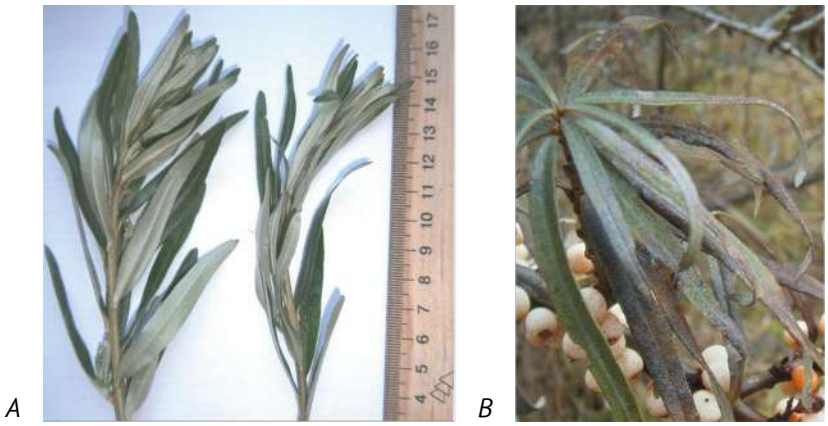
Note: *em – early maturing, mm – medium maturing, lm – late maturing*
Source: *developed by authors*

Table 1 demonstrates that plants of the late-maturing varieties Osoblyva and Adaptyvna are heavily damaged by gall mites (in 2020, the leaves and stems of Adaptyvna plants were damaged by more than 50%), while plants of the early-maturing varieties Rannya and mid-season Morkvyana are medium resistant or moderately damaged (Fig. 2).

Figure 2. *Leaves of plants of the variety Morkvyana with signs of damage by sea buckthorn gall mite*
Source: *photo by the authors*

To reduce the spread and damage caused by gall mites to sea buckthorn plants, several measures were implemented in 2020-2021, including various types of pruning (mainly rejuvenation (stimulating the growth of young healthy shoots), restoration (restoring a neglected bush) and regulatory (maintaining the crown in good condition, thinning, lighting)) and near-trunk and inter-row soil loosening. According to the results of the surveys on the presence of sea buckthorn with galls on the leaves after the agricultural measures, it became clear that the number of galls on the leaves significantly depends on a particular measure, regardless of the variety and maturity group.

For sea buckthorn varieties, regardless of the maturity group, using elements of agricultural technology both individually and in combination significantly reduces damage to plants by sea buckthorn gall mites. In particular, this can be observed most clearly for the early maturing variety Rannya, the mid-maturing variety Morkvyana, and the late maturing variety Osoblyva (Fig. 3). Notably, the plants of these varieties are more tree-like, in particular, this is characteristic of the Rannya variety, thus, in the agricultural technology of cultivation, it is advisable to compulsorily loosen the soil near the trunk (Table 2).



A *B*

***Figure 3**. Leaves of sea buckthorn plants of the variety Osoblyva in the I decade of June (A) and I decade of September (B) without signs of galls caused by sea buckthorn gall mite*
***Source:** photo by the authors*

***Table 2**. Damage to sea buckthorn leaves by gall mites depending on the maturity group and elements of agricultural technology*

No.	Variety name	Maturity group	Agri-event							
			Control		Cutting branches		Soil loosening		Cutting + Soil loosening	
			Average data on damage to sea buckthorn leaves (presence of galls), %							
			I decade of June	I decade of September	I decade of June	I decade of September	I decade of June	I decade of September	I decade of June	I decade of September
1	Rannya	em	0.5	10	0.7	9.5	0.4	0.8	0.8	0.9
2	Morkvyana	mm	5.1	17	3.7	12.2	3.2	4.4	3.5	2.5
3	Osoblyva	lm	5.2	48	4.1	32.3	21.5	15.8	11.7	9.5
4	Adaptyvna	lm	15	56	9.8	35.8	19.4	23.5	8.8	10.6

***Note:** em – early maturing, mm – mid-season, lm – late maturing; **p≥0.95*
***Source:** developed by authors*

The Morkvyana and Adaptyvna varieties are bushy, and annual soil loosening near the trunk promotes additional development of root shoots, which increases the possibility of overwintering of adult mites. But the plants of these varieties are more plastic to cutting, and, thus, annual gradual cutting of branches during the spring and summer period contributes to the reduction of sea buckthorn gall mite damage and increase of productivity, including fruit size and weight.

In 2021, all studied varieties were less damaged compared to 2020 (Table 3). In particular, the early maturing sea buckthorn variety Rannya is the least damaged by the gall mite due to the absence of gall development compared to all the varieties studied.

***Table 3**. Damage to sea buckthorn leaves by gall mites depending on the maturity group and elements of cultivation technology, 2021*

No.	Variety name	Maturity group	Agri-event							
			Control		Cutting branches		Soil loosening		Cutting + Soil loosening	
			Average data on damage to sea buckthorn leaves (presence of galls), %							
			I decade of June	I decade of September	I decade of June	I decade of September	I decade of June	I decade of September	I decade of June	I decade of September
1	Rannya	em**	2,2**	10.3	1.9	3.5	0.7	1.8	0.5	0.6
2	Morkvyana	mm	4.9	27.5	1.7	2.9	2.6	9.4	0.5	1.5
3	Osoblyva	lm	8.5	51.5	3.1	2.7	4.5	4.8	1.1	2.5
4	Adaptyvna	lm	15.4	47.2	3.8	5.5	6.4	13.5	2.5	7.7

***Note:** em – early maturing, mm – mid-season, lm – late maturing; **p≥0.95*
***Source:** developed by authors*

According to Table 3, the introduction of such elements of agrotechnology as pruning and soil loosening and their application in combination significantly reduces the development of galls in the fall by 66.0, 82.5 and 94.2%, respectively. For the Morkvyana variety, these data are 89.5, 65.8 and 94.5%, for the late-maturing varieties Osoblyva and Adaptyvna – 94.8, 90.7 and 95.1 and 88.3, 71.4 and 83.7%, respectively. It was established that the annual application of the elements of agricultural technology for cutting and loosening the soil in the complex contributes to a significant reduction in damage to the leaves of sea buckthorn plants (the presence of gall development, etc.), as evidenced by the comparison of data for 2020 and 2021 (Fig. 4).

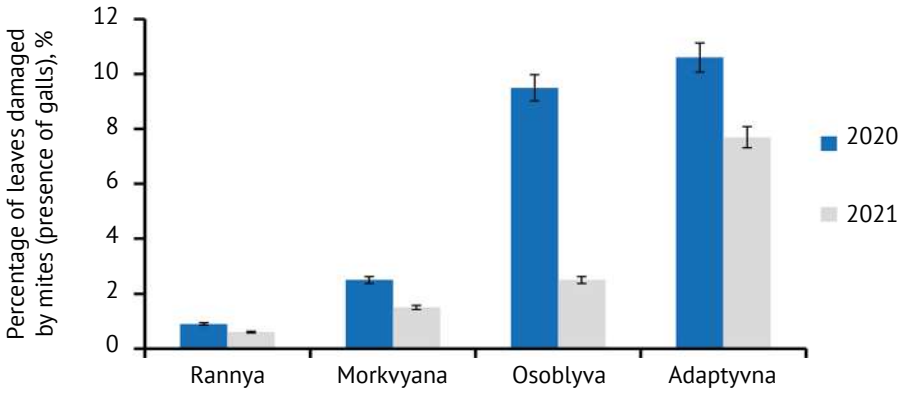


***Figure 3**. The presence of gall development on the leaves of sea buckthorn plants under the complex application of different types of cutting and soil loosening by years, %*
***Source:** developed by the authors*

Biological infestations of agricultural pests can have adverse effects, including reduced yields and economic costs. Thus, collecting and analysing information on biological and ecological features, in particular the ability to spread, is crucial in the model prediction of pests, in particular for the sea buckthorn gall mite. As Kuczyński *et al.* (2020) note, exploring the dispersal process is particularly challenging when the emphasis is on microscopic organisms such as gall mites, which are passively dispersed. Thus, the study of the appearance of gall development on the leaves and stems of different sea buckthorn varieties was the most simplified way to study the ecological and biological characteristics of the mite to the host plant. Authors Li *et al.* (2016), Mukwevho *et al.* (2017), and Bondareva *et al.* (2022) conducted surveys of gall development on plants as signs of pest parasitism, including gall mites, which allows assessing the level of leaf damage and the condition of plants in general. Thus, the conducted surveys of gall mites on sea buckthorn do not contradict the methodology of research on the ecological and biological features of gall mites. The research notes that mites' vital activity depresses the condition of plants. These aspects are noted in several works by other researchers (Kołątaj, 2019; Yanovskyi *et al.*, 2021), which demonstrate that tick parasitism results in plant stunting.

The research discusses the efficiency of agrotechnical measures to control pests. In addition, Moskalets *et al.* (2021; Melnyk, 2016) highlight these issues and confirm their feasibility. Other scientists and producers, in particular Yanovskyi *et al.* (2022), consider it advisable to apply biological measures, in particular, to conduct a maximum of 10 sprayings of trees (bushes) with biological acaricides, in particular in mother and graft plantations. Some authors (Omelchuk, 2019; Grynyk, 2020) suggest not considering the possibility of significant colonisation of plants by the mite, and selecting cuttings for propagation, disinfecting them with a 0.4% working concentration of Actofit, 0.2% emulsion concentrate when treated for 20-30 minutes, or a 0.5% solution, but for 8-11 minutes. Yanovskyi *et al.* (2022) propose to use chemical acaricides in the nursery system when 2-3 or more generations of the above pest are developing, during budding, before or after flowering, after harvesting and when deuterogynous females of the mite leave the galls to settle and overwinter in the diapause stage. Similar studies by the authors of the presented research on using biological and chemical preparations, and using increased doses of mineral fertilisers, which, by the way, contribute to the osmotic pressure of cell sap in the leaves, which adversely affects the life of the mite, are only at the initial stages and are ongoing in sea buckthorn orchards for mite control. Using tick-resistant varieties is suggested by De Lillo *et al.* (2018), who consider reducing economic costs in the cultivation of fruit and berry crops.

In general, the study of the vital activity of gall mites on many fruit and berry crops is relevant, since failure to consider this dangerous biotic factor in the 3-6th year of plant life results in a decrease in their drought and frost resistance, and a decrease in yield by 50 per cent or more.

Thus, due to the significant demand for sea buckthorn and the increase in its area in Ukraine, it is necessary to control the manifestation of pests, in particular the population of gall mites, which as obligate parasite feeds on the buds, leaves and shoots of plants, causing nutrient deficiencies and various physiological disorders and can probably transmit pathogenic organisms to plants, in particular of a viral nature, with serious consequences for the healthy state and productivity of plants of the above crop, which from the economic standpoint makes sea buckthorn gall mite a dangerous phytophagous pest of sea buckthorn orchard.

CONCLUSIONS

The biological and ecological features of sea buckthorn gall mites in the orchards of buckthorn in the Northern Forest-Steppe of Ukraine were determined. In the third decade of May to September-October, depending on the ripeness group of the sea buckthorn variety, signs of the harmfulness of *Eryophyes hippophaenus* Nal mites can be observed on infected plants. The usual symptoms are curling of the leaf edges, the appearance of blisters or growths 5 mm in diameter on the upper side of the blade, and discolouration of the leaf blade. Parasitism of sea buckthorn gall mites distorts annual shoots of plants.

In hybrid nurseries of the studied crop, sea buckthorn gall mites are mostly spread with planting material (seedlings, cuttings). In addition, it was noted that wild forms of sea buckthorn serve as reserves for gall mite populations, in protective strips of gardens, forest belts, and fallow lands, where they localise numerous populations. In the conditions of the northern part of the Forest-Steppe of Ukraine in sea buckthorn orchards, the most characteristic manifestation of sea buckthorn gall mite damage was observed on late-maturing varieties compared to early- and mid-maturing ones. It was established that the absence of planned cutting and soil loosening measures significantly increases the signs of tick parasitism on sea buckthorn plants, regardless of the variety maturity group.

Studies allowed suggesting that there may be a specific relationship between gall mites and endophytic fungi (in particular, the genera Alternaria, Cladosporium, Botrytis, Mycosphaerella, etc.), which was observed in late summer on plants 5-7 years old, manifested in the appearance of light or dark brown spots around the galls, and the death and loss of leaf tissue and the development of perforated leaves. Depending on the age of the plants, shaping, rejuvenating (in spring), restoring (in spring, summer) and regulating (in summer) cutting and soil loosening, mainly for tree-like plants, significantly reduces damage to the leaf surface and annual stems of sea buckthorn plants by gall mites.

Further widespread targeted introduction of sea buckthorn varieties in agroecosystems will increase the yield with the introduction of medium-resistant varieties and elements of cultivation technology, including mandatory shaping, thinning and sanitary cutting and soil loosening, which will reduce the number of pests, including sea buckthorn gall mites in sea buckthorn orchards.

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Обліпиховий галовий кліщ (*Aceria hippophaena* Nal.) в садах обліпихи крушиноподібної (*Hippophae rhamnoides* L.) та елементи агротехнології його контролю

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Анотація. Представленні дослідження дозволили більше розкрити особливості нових сортів обліпихи крушиноподібної, демонструючи біоекологічний потенціал їх рослин щодо пошкодження обліпиховим галовим кліщем, який сьогодні є не менше актуальним серед шкідників обліпихового саду. Тому вид Aceria hippophaena Nalepa (синонім Eriophyes hippophaenus Nalepa), який належить роду Artacris Keifer, 1970, є одним із небезпечних представників чотириногих кліщів по відношенню до рослин роду Hippophae L. Мета роботи передбачала дослідження біоекологічних особливостей вищезазначеного кліща і розробки заходів його контролю в садах обліпихи крушиноподібної. Під час досліджень використовували польовий і лабораторний методи згідно методики проведення кваліфікаційної експертизи сортів лісових видів рослин на придатність до поширення в Україні. З'ясовано, що ареал обліпихового галового кліща охоплює значні території країн Західної, Північно-Західної Європи та північні райони Східної Європи, в т.ч. України. В умовах північної частини Лісостепу України в садах ранньо-, середньостиглих і пізньостиглі сортів обліпихи крушиноподібної досліджували біоекологічні особливості і рівень шкодочинності обліпихового галового кліща на рослинах досліджуваної культури. Відмічено, що обліпиховий галовий кліщ веде прихований спосіб життя, харчується всередині бруньок і листків рослин обліпихи крушиноподібної. З'ясовано, що цей паразит сильно шкодить рослинам обліпихи на початкових етапах їх онтогенезу. При чому сильно пошкоджені листки деформуються, передчасно всихають і опадають, що нерідко призводить до їх загибелі. Встановлено, що заселеність і пошкодження кліщем рослин ранньостиглих сортів менша, ніж середньо- і пізньостиглих. Практична цінність роботи полягає в тому, що було доведено, що дво- або трьохкратний механізований обробіток ґрунту в міжрядді і у при стовбуровій зоні, формуюча, омолоджувальна (навесні), відновлювальна (навесні, влітку) і регулююча (влітку) обрізки істотно зменшують пошкодження рослин обліпихи галовим кліщем

Ключові слова: чотириногий кліщ, біоекологічні особливості, шкодочинність, рослини обліпихи, способи контролю шкідника