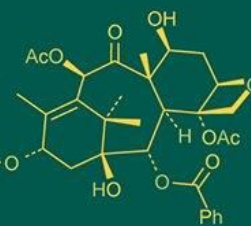
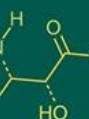
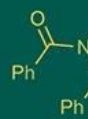


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Biological control in peach, pear and plum orchard

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Abstract

Peach, pear and plum orchards are frequently challenged by a wide range of insect pests that reduce yield and fruit quality, leading to heavy reliance on chemical pesticides. However, increasing concerns over pesticide resistance, environmental pollution, residue accumulation and negative effects on non-target organisms have encouraged the adoption of biological control strategies. This review examines the role of biological control in the sustainable management of key insect pests in peach, pear and plum orchards, with emphasis on the use of natural enemies such as predators, parasitoids and entomopathogenic microorganisms. The effectiveness of conservation, augmentation and classical biological control approaches is discussed, along with their integration into orchard ecosystems. Comparisons with chemical control highlight the ecological and economic advantages of biological methods, including improved biodiversity, reduced chemical inputs and long-term pest regulation. The review also identifies current limitations and future research needs to enhance the practical implementation of biological control in temperate fruit orchards.

Keywords: Natural enemies, Entomopathogens, Eco-friendly pest management, Parasitoids

Introduction

Peach (*Prunus persica* L.), pear (*Pyrus communis*) and plum (*Prunus domestica*) are vital fruit species within the Rosaceae family, widely recognized for their high nutritional value and substantial commercial importance. These species are widely farmed across temperate parts of the world and contribute significantly to global fruit production due to their excellent fruit quality, economic value and adaptability to varied agro-climatic conditions (Khadiji *et al.*, 2025; Simionca *et al.*, 2023; Afanador-Barajas *et al.*, 2022)^[28, 50, 2].

Biological control refers to the use of natural enemies (predators, parasitoids and pathogens) against pests. Since the 1800s, 'traditional biological control' has involved importing natural enemies to decrease alien pests. However, this technique is being scrutinized due to the potential consequences on non-target, native species (Follett and Duan, 2012)^[20]. Culturing methods for natural enemies were established in the 1900s, enabling biological control programs against many pests (van Lenteren, 2012). This approach remains popular among farmers, despite the increased expenses compared to insecticide sprays.

Biological control reduces environmental contamination, protects pollinators and other non-target creatures and lowers the likelihood of pesticide resistance when compared to chemical pesticides. Its incorporation into orchard management systems promotes safer fruit production, enhanced ecosystem stability and long-term pest control. It has often been stated that using biological control agents poses no risks and is environmentally safe (Batra, 1982; DeBach & Rosen, 1991; Douthett, 1972; Van Lenteren, 1983)^[15, 16, 58].

Peach, Pear and Plum - Plant Characteristics

SN	Characteristic	Peach, <i>Prunus persica</i>	Pear, <i>Pyrus communis</i>	Plum, <i>Prunus domestica</i>
1	Fruit type	Drupe (stone fruit)	Pome (core fruit)	Drupe (stone fruit)
2	Seeds	One large seed in stone	Multiple small seeds	One large seed in stone
3	Leaf morphology	Narrow, lanceolate	Broad, ovate	Oblong-elliptic
4	Growth habit	Smaller tree, self-compatible genetics	Medium to large tree	Small to medium tree

Techniques in Biological Control of Peach, Pear and Plum

In orchards of peach (*Prunus persica*), pears (*Pyrus communis*) and plums (*Prunus domestica*) biological control uses a number of complimentary methods to suppress insect pests while preserving ecological balance. These methods are crucial to integrated pest management (IPM) initiatives.

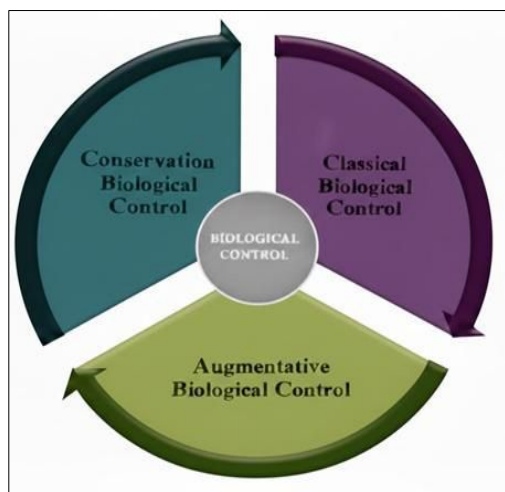


Fig 1: Techniques in Biological Control

1. Classical Biological Control

Classical biological control is the deliberate introduction of exotic natural enemies to control invasive or non-native pests. (Eilenberg *et al.*, 2001)^[19]

- This approach is mostly used to combat invasive pests in orchard systems.
- Developed a database of over 7000 traditional biological introductions used until 2006 to battle all forms of weed and invertebrate pests (Cock *et al.*, 2009; Cock *et al.*, 2010)^[12].
- The following countries have released over 100 biological control agents (BCAs): USA, Australia, Canada, New Zealand, South Africa, UK (nearly completely overseas territories), Fiji, Mauritius, India, France (mainly overseas territories), Israel and Guam (Cock *et al.*, 2016)^[13].
- *Pterochloroides persicae* has become a pest of peach and almond trees in numerous countries throughout southern Europe, the eastern Mediterranean, North Africa and most recently, Yemen, where it has been documented to cause considerable damage. The

potential of several known natural enemies as biological control agents is examined and many braconid parasitoids, such as *Pauesia antennata* and *Aphidius* spp. are highlighted as promising (Kairo and Poswal, 1995)^[27].

Advantages

- Long-term management
- Sustainable for the environment

Limitations

- non-target effects risk
- Slow establishment and regulatory constraints (Messing & Brodeur, 2018)^[39]
- Cooperatively engaged with other organisms to intensify pest issues (Howarth, 1991)^[24]

2. Augmentative Biological Control

Raising natural enemies in large quantities and releasing them on a regular basis to boost their population density is known as augmentative biological control.

These subdivided into two terms,

2.1 Inoculative Release

- Small numbers of natural enemies are released early in the season to establish and multiply.
- The seasonal inoculative release approach involves collecting and mass rearing natural enemies before releasing them onto short-term crops (6-12 months) with high insect populations. During the growing season, a large number of natural enemies are released in order to obtain immediate control and establish a population for future control (Van Lenteren & Bueno, 2003; Hajek and Eilenberg, 2018)^[58, 23].

2.2 Inundative Release

- Large numbers of natural enemies are released to achieve immediate pest suppression.
- In the inundative release approach, beneficial organisms are gathered, mass-reared, and released in vast numbers to eradicate pests immediately (also known as "biotic insecticide"). Natural enemies, rather than their offspring, provide the majority of pest control (Van Lenteren & Bueno, 2003; Hajek and Eilenberg, 2018)^[58, 23].

3. Conservation Biological Control

Conservation biological control aims to improve and sustain current natural enemy populations through habitat and agricultural management methods.

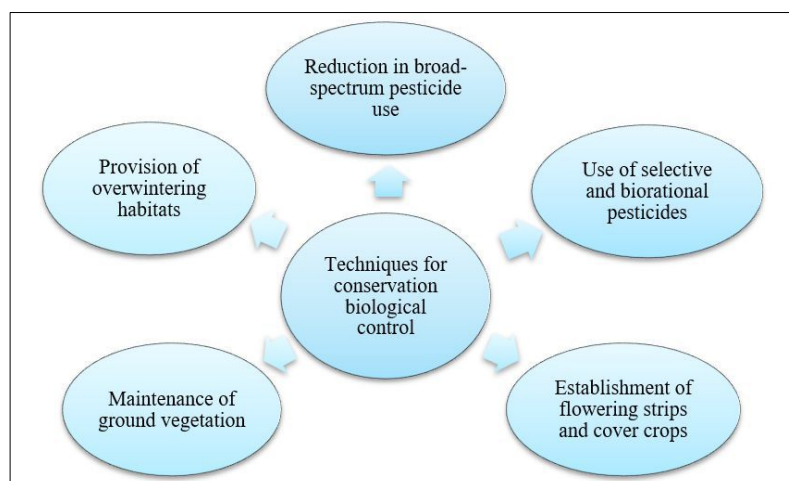


Fig 2: Techniques for conservation biological control

Table 1: Peach pests and their biological control

SN	Pest	Biological control	Type	Reference
1	Oriental Fruit Moth	Rhabditida: Heterorhabditidae, Steinernematidae	Entomopathogenic nematodes (EPNs)	Negrisoni <i>et al.</i> , 2013 ^[41]
		<i>Chrysoperla rufilabris</i> and <i>C. plorabunda</i>	Predators	Atanassov <i>et al.</i> , 2003 ^[8]
		<i>Coccinella septempunctata</i> and <i>Harmonia axyridis</i>	Predators	Atanassov <i>et al.</i> , 2003 ^[8]
		<i>Orius insidiosus</i>	Predators	Atanassov <i>et al.</i> , 2003 ^[8]
		<i>Trichogramma minutum</i>	Egg parasitoid	Atanassov <i>et al.</i> , 2003 ^[8]
		Extrafloral nectaries (EFNs)	Attractant	Mathews <i>et al.</i> , 2007; Mathews <i>et al.</i> , 2011; Mathews <i>et al.</i> , 2009 ^[36, 37, 38]
2	Peach Twig Borer	<i>Apanteles ruficrus</i> , <i>Diplazon laetatorius</i> , <i>Microgaster tiro</i>	Hymenopterous parasitoids	Abdel-Samad, 2006 ^[11]
		Ecodian Combi CM+AL	Pheromone dispensers	Kutinkova <i>et al.</i> , 2011 ^[31]
3	Green Peach Aphid	<i>Aphidius transcaspicus</i> Telenga and <i>Praon volucre</i>	Parasitoids	Aparicio <i>et al.</i> , 2019 ^[4]
		<i>Episyrphus balteatus</i> , <i>Aphidoletes aphidimyza</i> , and <i>Orius majusculus</i>	Predators	Aparicio <i>et al.</i> , 2020 ^[3]
		<i>A. aphidimyza</i> and <i>O. majusculus</i>	Predators	Aparicio <i>et al.</i> , 2020; Aparicio <i>et al.</i> , 2021 ^[3, 5]
		<i>Beauveria bassiana</i> and <i>Lecanicillium lecanii</i>	Entomopathogenic fungal strains	Javed <i>et al.</i> , 2019; Nazir <i>et al.</i> , 2018; ^[25, 40]
		<i>Propylea quatuordecimpunctata</i>	Predators	Lami <i>et al.</i> , 2024 ^[24]
		<i>Aphidius colemani</i>	Parasitoid	Lami <i>et al.</i> , 2024 ^[24]
4	Mites	<i>Amblyseius fallacis</i>	Predator	Lester <i>et al.</i> , 1999 ^[35]

Table 2: Pear pests and their biological control

SN	Pest	Biological control	Type	Reference
1	Pear Psylla	<i>Trechnites insidiosus</i> and <i>Prionomitus mitratus</i>	Parasitoids	Krndija <i>et al.</i> , 2024; DuPont and Strohm, 2020; Tougeron <i>et al.</i> , 2021 ^[29, 17, 55]
		<i>Anthocoris nemoralis</i>	Predator	Krndija <i>et al.</i> , 2024 ^[29]
		<i>Chrysoperla externa</i> , <i>Chrysopidae</i> sp., <i>Hemerobiidae</i> sp., <i>Harmonia axyridis</i> and <i>Cycloneda sanguinea</i>	Predator	Valle <i>et al.</i> , 2022 ^[56]
		<i>Deraeocoris brevis</i> and <i>Campylomma verbasci</i> , <i>Chrysoperla plorabunda</i> and <i>Chrysopa nigricornis</i>	Predators	DuPont and Strohm, 2020 ^[17]
		<i>Beauveria bassiana</i> and <i>Paecilomyces fumosoroseus</i>	Entomopathogenic fungi	Puterka, 1999; Puterka, 1994
		Azadirachtin and abamectin	Biopesticides	Wheeler <i>et al.</i> , 2020 ^[61]
2	Codling Moth	<i>Mastrus ridibundus</i> and <i>Ascogaster quadridentata</i>	Parasitoids	Lacey & Unruh, 2005; ^[33]
		Codling moth granulovirus (CpGV)	Virus	Lacey & Unruh, 2005; Eberle <i>et al.</i> , 2008; Arthurs <i>et al.</i> , 2007 ^[33, 18, 7]
		<i>Bacillus thuringiensis</i> (Bt)	Bacteria	Lacey and Siegel, 2000 ^[32]
		Mermithidae and Steinernematidae	Entomopathogenic nematodes	Poinar, 1991 ^[43]
		<i>Steinernema feltiae</i> and <i>Steinernema carpocapsae</i>	Entomopathogenic nematodes	Juan <i>et al.</i> , 2008 ^[26]
		Spinosad	Biopesticide	Arthurs <i>et al.</i> , 2007 ^[7]
3	sawfly	<i>Heterorhabditis bacteriophora</i> and <i>Steinernema carpocapsae</i>	Entomopathogenic nematodes (EPNs)	Curto <i>et al.</i> , 2007 ^[14]
		<i>Steinernema feltiae</i>	Entomopathogenic nematodes (EPNs)	Curto <i>et al.</i> , 2007 ^[14]
4	pear leaf blister mite	<i>Typhlodromus pyri</i>	Predator	Praslička <i>et al.</i> , 2011 ^[44]

Table 3: Plum pests and their biological control

SN	Pest	Biological control	Type	Reference
1	Plum fruit moth	<i>Bacillus thuringiensis</i>	Biopesticide	Vávra <i>et al.</i> , 2023 ^[60]
		Pheromone dispenser	Trap	Stefanova <i>et al.</i> , 2019a; Stefanova <i>et al.</i> , 2019b ^[52, 53]
		<i>Beauveria bassiana</i>	Biopesticide	Petrova, 2023 ^[42]
		<i>Trichogramma dendrolimi</i>	Parasitoid	Qu <i>et al.</i> , 2020
2	Plum and Prune Twig Borer	<i>Bacillus thuringiensis</i>	Biopesticide	Seethapathy <i>et al.</i> , 2022 ^[48]
		birds, spiders, beetles and ants	Predators	Biddinger & Leslie, 2014

				[10]
		<i>Steinernema carpocapsae</i>	Entomopathogenic nematodes	Arroyo <i>et al.</i> , 2012 [6]
3	Plum Sawfly	<i>Steinernema feltiae</i> , <i>S. carpocapsae</i> and <i>Heterorhabditis bacteriophora</i>	Entomopathogenic nematodes	Seethapathy <i>et al.</i> , 2022 [48]
4	San Jose Scale	<i>Aphytis</i> (proclia group), <i>Encarsia perniciosi</i> , <i>Prospaltella perniciosi</i>	Parasitoids	Seethapathy <i>et al.</i> , 2022 [48]
		<i>Chilocorus circumdatus</i> and <i>Coccinella infernalis</i>	Predators	Seethapathy <i>et al.</i> , 2022 [48]
5	Leaf Curl Plum Aphid	<i>Chauliognathus pensylvanicus</i> , <i>Chrysoperla carnea</i> , <i>Chaitophorus</i> sp., <i>Micromus variegatus</i> , and <i>Syrphus opinator</i>	Predators	Seethapathy <i>et al.</i> , 2022 [48]
6	Plum Curculio	Steinernematidae and Heterorhabditidae	EPNs	Grewal <i>et al.</i> , 2005; Gaugler <i>et al.</i> , 2006 [22, 21]
		<i>Steinernema feltiae</i> and <i>S. riobrave</i>	EPNs	Shapiro-Ilan <i>et al.</i> , 2002 [49]
		<i>Beauveria bassiana</i> and <i>Metarhizium anisopliae</i>	Entomopathogenic fungi	Tedders <i>et al.</i> , 1982 [54]
		<i>Anaphes conotracheli</i> , <i>Nealolus curculionis</i> , <i>Thersilochus conotracheli</i>	Parasitoid	Snapp, 1930; Krombein <i>et al.</i> , 1979 [51, 30]

Conclusion

In peach, pear and plum orchards, biological control is a practical and growing part of sustainable pest management. Predators, parasitoids and entomopathogenic microbes are examples of natural enemies that can effectively control major insect pests while resolving many of the environmental and health issues related to heavy chemical pesticide use. Long-term pest control, biodiversity promotion and orchard ecosystem resilience have all been shown to be significantly enhanced by conservation, augmentation and traditional biological control techniques. Biological methods limit adverse effects on non-target organisms, minimize the development of resistance and reduce pesticide inputs when compared to chemical control.

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Reference

1. Abdel-Samad SS. Activity of peach twig borer *Anarsia lineatella* Zeller and its associated bio-agents on peach trees. Arab Universities Journal of Agricultural Sciences. 2006;14(2):813-821.
2. Afanador-Barajas LN, Wilches AV, Macana YA, Medina-Pérez G. History, distribution, production and taxonomic classification of plum. In: Handbook of plum fruit. Boca Raton: CRC Press; 2022. p. 1-20.
3. Aparicio Y, Gabarra R, Armó J. Interactions among *Myzus persicae*, predators and parasitoids may hamper biological control in Mediterranean peach orchards. Entomologia Generalis. 2020;40(3):217-229.
4. Aparicio Y, Gabarra R, Riudavets J, Starý P, Tomanović Ž, Kocić K, *et al.* Hymenoptera complex associated with *Myzus persicae* and *Hyalopterus* spp. in peach orchards in northeastern Spain and prospects for biological control of aphids. Insects. 2019;10(4):109-123.
5. Aparicio Y, Riudavets J, Gabarra R, Agustí N, Rodríguez-Gasol N, Alins G, *et al.* Can insectary plants enhance the presence of natural enemies of the green peach aphid (*Myzus persicae*) (Hemiptera: Aphididae) in Mediterranean peach orchards? Journal of Economic Entomology. 2021;114(2):784-793.
6. Arroyo FT, Castejón M, García-Galavís PA, Santamaría C, Camacho M, Montero MC, Daza A. Keys to improve Japanese plum organic farming under Mediterranean climate conditions. Acta Horticulturae. 2012;933:469-475.
7. Arthurs SP, Lacey LA, Miliczky ER. Evaluation of the codling moth granulovirus and spinosad for codling moth control and impact on non-target species in pear orchards. Biological Control. 2007;41(1):99-109.
8. Atanassov A, Shearer PW, Hamilton GC. Peach pest management programs impact beneficial fauna abundance and *Grapholita molesta* (Lepidoptera: Tortricidae) egg parasitism and predation. Environmental Entomology. 2003;32(4):780-788.
9. Batra SW. Biological control in agroecosystems. Science. 1982;215(4529):134-139.
10. Biddinger DJ, Leslie TW. Observations on the biological control agents of the American plum borer (Lepidoptera: Pyralidae) in Michigan cherry and plum orchards. Great Lakes Entomologist. 2014;47(1-2):1-8.
11. Cock MJW, van Lenteren JC, Brodeur J, Barratt BIP, Bigler F, Bolckmans K, *et al.* Do new access and benefit-sharing procedures under the Convention on Biological Diversity threaten the future of biological control? Biological Control. 2010;55:199-218.
12. Cock MJW, van Lenteren JC, Brodeur J, Barratt BIP, Bigler F, Bolckmans K, *et al.* The use and exchange of biological control agents for food and agriculture. Background Study Paper No. 47. Rome: FAO; 2009. p. 1-88.
13. Cock MJ, Day RK, Hinz HL, Pollard KM, Thomas SE, Williams FE, *et al.* The impacts of some classical biological control successes. CABI Reviews. 2016;11:1-58.
14. Curto G, Boselli M, Vergnani S, Reggiani A. Effectiveness of entomopathogenic nematodes in the control of sawfly (*Hoplocampa brevis*) in pear orchards. IOBC-WPRS Bulletin. 2007;30:13-17.
15. DeBach P, Rosen D. Biological control by natural enemies. Cambridge: Cambridge University Press; 1991.
16. Douth RL. Biological control: parasites and predators. New York: McGraw-Hill; 1972. p. 288-297.
17. DuPont ST, Strohm C. Integrated pest management programmes increase natural enemies of pear psylla in Central Washington pear orchards. Journal of Applied Entomology. 2020;144(1-2):109-122.

18. Eberle KE, Asser-Kaiser S, Sayed SM, Nguyen HT, Jehle JA. Overcoming the resistance of codling moth against conventional *Cydia pomonella* granulovirus by a new isolate CpGV-I12. *Journal of Invertebrate Pathology*. 2008;98(3):293-298.
19. Eilenberg J, Hajek A, Lomer C. Suggestions for unifying the terminology in biological control. *BioControl*. 2001;46(4):387-400.
20. Follett P, Duan JJ, editors. Nontarget effects of biological control. New York: Kluwer Academic Publishers; 2012.
21. Gaugler R, Adams BJ, Bilgrami AL, Shapiro-Ilan DI. Source of trait deterioration in entomopathogenic nematodes *Heterorhabditis bacteriophora* and *Steinernema carpocapsae* during *in vivo* culture. *Nematology*. 2006;8(3):397-409.
22. Grewal PS, Ehlers RU, Shapiro-Ilan DI, editors. Nematodes as biocontrol agents. Wallingford: CABI; 2005.
23. Hajek AE, Eilenberg J. Natural enemies: an introduction to biological control. Cambridge: Cambridge University Press; 2018.
24. Howarth FG. Environmental impacts of classical biological control. *Annual Review of Entomology*. 1991;36:485-509.
25. Javed K, Javed H, Mukhtar T, Qiu D. Pathogenicity of entomopathogenic fungal strains to green peach aphid *Myzus persicae* Sulzer (Homoptera: Aphididae). *Egyptian Journal of Biological Pest Control*. 2019;29(1):92-100.
26. Juan D, Rouvière JB, Mouton S, Coulomb P. Biological control strategy of codling moth with entomopathogenic nematodes in organic and conventional farming. In: *Proceedings of the 7th International Conference on Integrated Fruit Production*; 2008. p. 95-100.
27. Kairo MT, Poswal MA. The brown peach aphid, *Pterochloroides persicae* (Lachninae: Aphididae): prospects for IPM with emphasis on classical biological control. *FAO Plant Protection Bulletin*. 1995;16(3):41-47.
28. Khadivi A, Mirheidari F, Saeidifar A, Moradi Y, Tunç Y, Mishra DS. Morphological and pomological characterization of peach (*Prunus persica* (L.) Batsch) accessions. *Food Science & Nutrition*. 2025;13(7):1-21.
29. Krndija J, Ivezić A, Sarajlić A, Barošević T, Kuzmanović B, Petrović K, *et al.* Natural enemies of pear psylla *Cacopsylla pyri* (Hemiptera: Psyllidae) and prospects for biological control. *Agronomy*. 2024;14(4):668-689.
30. Krombein KV, Hurd PD, Smith DR, Burks BD. Catalog of Hymenoptera in America north of Mexico. Vol. 1. Washington DC: Smithsonian Institution Press; 1979. p. 1199-2209.
31. Kutinkova H, Dzhuvinov V, Samietz J. Control of peach twig borer and oriental fruit moth by mating disruption in apricot orchards. *Acta Horticulturae*. 2012;966:169-174.
32. Lacey LA, Siegel JP. Safety and ecotoxicology of entomopathogenic bacteria. In: *Entomopathogenic bacteria*. Dordrecht: Springer; 2000. p. 253-273.
33. Lacey LA, Unruh TR. Biological control of codling moth (*Cydia pomonella*) and its role in IPM with emphasis on entomopathogens. *Vedalia*. 2005;12(1):33-60.
34. Lami F, Burgio G, Magagnoli S, Depalo L, Lanzoni A, Frassinetti E, *et al.* Effects of natural insecticides on green peach aphid *Myzus persicae* and its natural enemies *Propylea quatuordecimpunctata* and *Aphidius colemani*. *Insects*. 2024;15(7):556-571.
35. Lester PJ, Thistlewood HMA, Marshall DB, Harmsen R. Assessment of *Amblyseius fallacis* (Acari: Phytoseiidae) for biological control of tetranychid mites in peach orchards. *Experimental and Applied Acarology*. 1999;23(12):995-1009.
36. Mathews CR, Bottrell DG, Brown MW. Extrafloral nectaries alter arthropod community structure and mediate peach (*Prunus persica*) plant defense. *Ecological Applications*. 2009;19(3):722-730.
37. Mathews CR, Bottrell DG, Brown MW. Interactions between extrafloral nectaries, ants, and natural enemies affect biological control of *Grapholita molesta*. *Environmental Entomology*. 2011;40(1):42-51.
38. Mathews CR, Brown MW, Bottrell DG. Leaf extrafloral nectaries enhance biological control of *Grapholita molesta* in peach. *Environmental Entomology*. 2007;36(2):383-389.
39. Messing R, Brodeur J. Current challenges to the implementation of classical biological control. *BioControl*. 2018;63(1):1-9.
40. Nazir T, Basit A, Hanan A, Majeed MZ, Qiu D. *In vitro* pathogenicity of entomopathogenic fungi against green peach aphid *Myzus persicae*. *Agronomy*. 2019;9(1):7-18.
41. Negrisoni CR, Negrisoni AS Jr, Garcia MS, Dolinski C, Bernardi D. Control of *Grapholita molesta* with entomopathogenic nematodes in peach orchards. *Experimental Parasitology*. 2013;135(2):466-470.
42. Petrova V. Control of plum fruit moth *Grapholita funebrana* in organic plum production. *Agricultural Science and Technology*. 2023;15(3):57-60.
43. Poinar GO. Nematode parasites. In: van der Geest LPS, Evenhuis HH, editors. *Tortricid pests: biology, natural enemies and control*. Amsterdam: Elsevier; 1991. p. 273-281.
44. Praslička J, Schlarmannová J, Matejovičová B, Tancík J. Predatory mite *Typhlodromus pyri* as a biocontrol agent of *Eriophyes pyri* on pear. *Biologia*. 2011;66(1):146-148.
45. Puterka GJ. Fungal pathogens for arthropod pest control in orchard systems. *BioControl*. 1999;44(2):183-209.
46. Puterka GJ, Humber RA, Poprawski TJ. Virulence of fungal pathogens to pear psylla. *Environmental Entomology*. 1994;23(2):514-520.
47. Qu Y, Chen X, Monticelli LS, Zhang F, Desneux N, Wang S. Parasitism performance of *Trichogramma dendrolimi* on plum fruit moth *Grapholita funebrana*. *Entomologia Generalis*. 2020;40(4):385-395.
48. Seethapathy P, Gothandaraman R, Gurudevan T, Malik IA. Diseases, pests and disorders in plum. In: *Handbook of plum fruit*. Boca Raton: CRC Press; 2022. p. 133-176.
49. Shapiro-Ilan DI, Mizell RF III, Campbell JF. Susceptibility of plum curculio *Conotrachelus nenuphar* to entomopathogenic nematodes. *Journal of Nematology*. 2002;34(3):246-252.

50. Simionca-Marcășan LI, Pop R, Somsai PA, Oltean I, Popa S, Sestras AF, *et al.* Comparative evaluation of *Pyrus* species for pear breeding. *Agronomy*. 2023;13(5):1264-1278.
51. Snapp OI. Life history and habits of the plum curculio in the Georgia peach belt. Washington DC: USDA; 1930.
52. Stefanova DR, Kutinkova HY, Savov PV, Andreev RA, Palagacheva NG, Tityanov MG. Control of plum fruit moth *Grapholita funebrana* by ISOMATE®-OFM TT dispensers. *IOBC-WPRS Bulletin*. 2019;146:64-68.
53. Stefanova D, Vasilev P, Kutinkova H, Andreev R, Palagacheva N, Tityanov M. Possibilities for control of plum fruit moth *Grapholita funebrana* by pheromone dispensers. *Journal of Biopesticides*. 2019;12(2):153-156.
54. Tedders WL, Weaver DJ, Wehunt EJ, Gentry CR. Bioassay of *Metarhizium anisopliae*, *Beauveria bassiana* and *Neoplectana carpocapsae* against *Conotrachelus nenuphar*. *Environmental Entomology*. 1982;11(4):901-904.
55. Tougeron K, Iltis C, Renoz F, Albittar L, Hance T, Demeter S, Le Goff GJ. Ecology and biology of *Trechmites insidiosus* and its potential for biological control of pear psyllids. *Pest Management Science*. 2021;77(11):4836-4847.
56. Valle D, Cabrera N, Clavijo F, Mujica V, Gonzalez A, Siri M, Lavandero B. Who is feeding on pear psylla? Molecular ecology approach for biological control of *Cacopsylla bidens*. *International Journal of Pest Management*. 2022;68(4):390-401.
57. Van Lenteren JC. The potential of entomophagous parasites for pest control. *Agriculture, Ecosystems & Environment*. 1983;10(2):143-158.
58. Van Lenteren JC, Bueno VH. Augmentative biological control of arthropods in Latin America. *BioControl*. 2003;48(2):123-139.
59. Van Lenteren JC. *IOBC Internet book of biological control*. Version 6. Wageningen: IOBC; 2012.
60. Vávra R, Kaplan J, Falta V, Maryška L. Monitoring, prevention and control of plum moth. *BIOFRUITNET Practice Abstract*. 2023;1-4.
61. Wheeler CE, Vandervoort C, Wise JC. Organic control of pear psylla using trunk injection. *Insects*. 2020;11(9):650-662.