

BNHC E-MAGAZINE

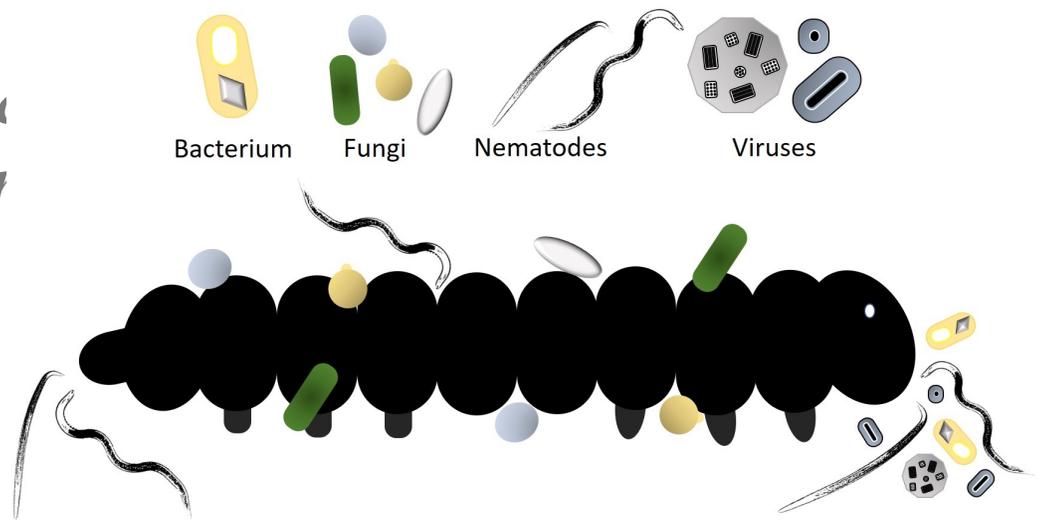
Introducing a convenient way! *Earn your diploma online with one of the most comprehensive study programs available in social network*



BioNatural Healing College

Online 5 Diplomas

Offers a dynamic quality education to change and improve your quality of life by offering online education In convenient way.



Infection routes of entomopathogens

Graphic: Surendra Dara

FIND YOUR KEY TO SUCCESS!

Contents

- **Message:** from the President of BNHC
- **BNHC Directory: Board of Directors:** Dr. Nadir Sidiqi Ph.D., Mrs. Aziza Sidiqi, Mr. Zalmi Gulzarzada, Mr. Ghaus Siddiqi, Mr. Naveed Siddiqi
- **Staff & Faculty:** Mr. Shareef Karim, Mr. Wais Siddiqi, Prof. Rosalie Stafford, Dr. Muhammed Adil, Dr. Nadir Sidiqi Ph.D., Dr. Tanveer Alam, and Dr. Vivek Sharma.
- **Learning:**
- **BioNatural Healing**
- Medicinal plants, Nutrition, Health, Diet, Body, Mind, Spirit, Sleep, Exercise and related issues.
- **Science Research:**
- Agriculture, Environment, Public Health, Technology
- **Innovation, Educational Announcement (Conference, Workshop):**
- **BNHC News & Advertisements:**
- **About US:** Mission, Vision
- **Contact US:**
- **Email:** info@bionaturalhealingcollege.org
- **Phone:** (909) 242-6342 P.O. Box 218 La Verne, California 91750 USA.
- [BioNatural Healing College.org](http://BioNaturalHealingCollege.org)

Message: from the President of BioNatural Healing College (BNHC)



Greetings!

First and foremost, I am extremely thankful to Almighty God for granting me this opportunity to present the BioNatural Healing College (BNHC), BNHC E-Magazine to our dear readers. Also, I would like to thank you all, especially the dear readers who send us their valuable feedback and support. The information in this magazine is solely for educational purposes.

We hope this BNHC- E-Magazine will be useful to you based on the contribution and dedication of many other respected researchers and colleagues around the globe. Thanking and wish you all the best health and prosperous life.

Best regards,

Dr. Nadir Sidiqi Ph.D.



BioNatural Healing College

BioNatural Healing College Stands on Seven Core Pillar Foundations as follows:

1. All living organisms are made from the water this beautiful connection, connects us to praise the Creator of Creation for the provision of feeding, fueling, and healing to humanity.
2. No harm to public health and environmental health (Biodiversity) including pollinators, surface water, groundwater, soil, and air.
3. A series of complex chains involved with food production from the field to the mouth of the human body desperately needs scientific research to maximize healthy nutritionally food production and end malnutrition and food insecurity.
4. Harmful pests such as insects, and pathogens causing to human and plant health and loss of economic problems. BioNatural chemicals from plants, microorganisms, and ocean-living organisms exist and need further research to discover along with safety to utilize for the health improvement of humans as well as BioNatural Pest Management (insects, fungi, bacteria, various, nematodes, weeds, rodents, etc.).
5. Listen, love, appreciate, and respect with deep conscience and subconscious the connection between the genes of your body and beautifully ecologically in sense of feeling, feeding, fueling, and healing.
6. The brilliant human mind can irrigate with balance drinking clean water as a whole-body system to detoxify the toxicant from their body systems as well as to detoxify the soil, water, and environment from harmful chemicals, particularly pesticides through collaboration, and dedication from the individual, family, community, and scientific community locally and globally.
7. BioNatural Healing College provides a high-quality science base foundation through online education to fit and accommodate the needs of each prospective student for the sustainability and prosperity of his or her own, family, community, and humanity.

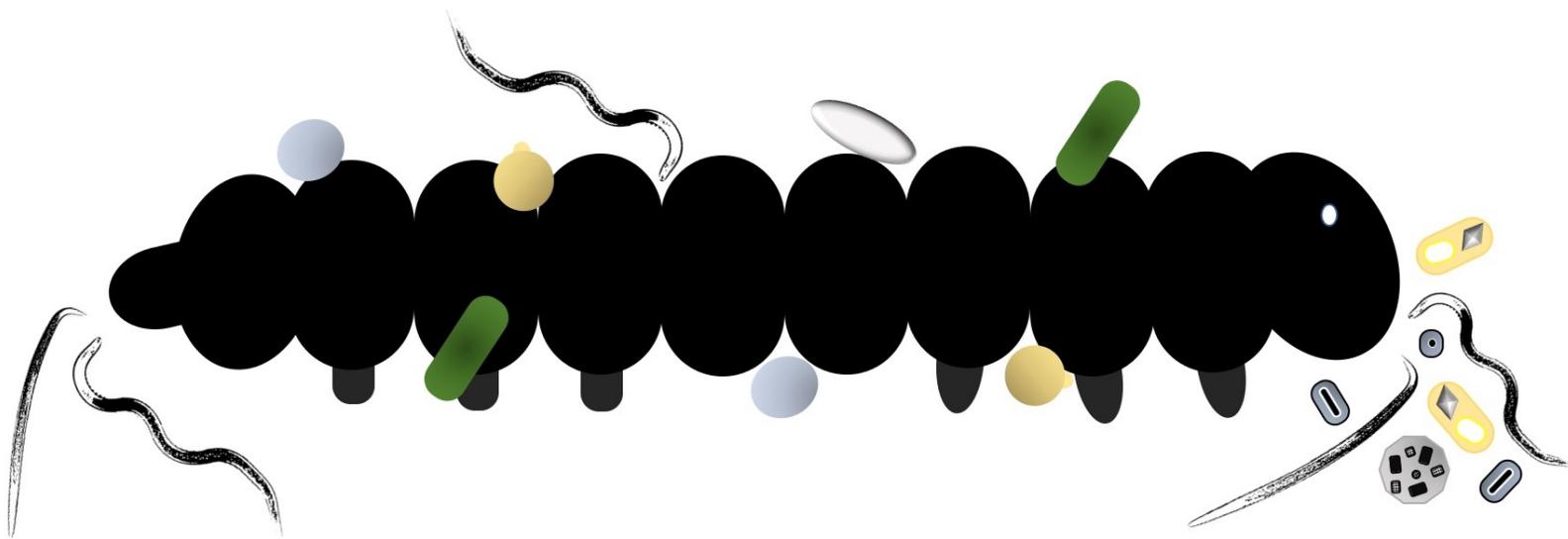
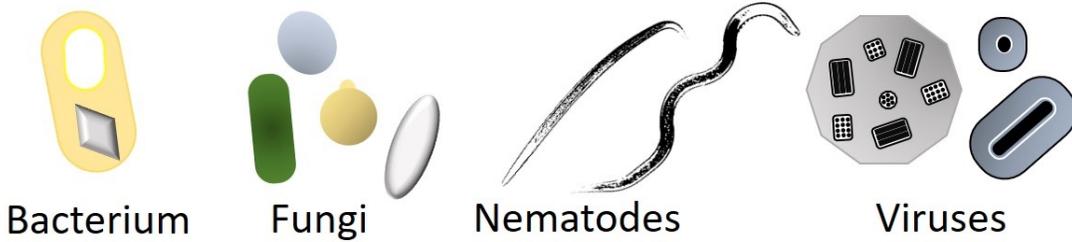
Entomopathogenic microorganisms: modes of action and role in IPM

By Dr. Surendra K. Dara with his republished from the original link entomopathogens



Entomopathogens are microorganisms that are pathogenic to arthropods such as insects, mites, and ticks. Several species of naturally occurring bacteria, fungi, nematodes, and viruses infect a variety of arthropod pests and play an important role in their management. Some entomopathogens are mass-produced in vitro (bacteria, fungi, and nematodes) or in vivo (nematodes and viruses) and sold commercially. In some cases, they are also produced on small scale for non-commercial local use. Using entomopathogens as biopesticides in pest management is called microbial control, which can be a critical part of integrated pest management (IPM) against several pests.

Some entomopathogens have been or are being used in a classical microbial control approach where exotic microorganisms are imported and released for managing invasive pests for long-term control. The release of exotic microorganisms is highly regulated and is done by government agencies only after extensive and rigorous tests. In contrast, commercially available entomopathogens are released through inundative application methods as biopesticides and are commonly used by farmers, government agencies, and homeowners. Understanding the mode of action, ecological adaptations, host range, and dynamics of pathogen-arthropod-plant interactions is essential for successfully utilizing entomopathogen-based biopesticides for pest management in agriculture, horticulture, orchard, landscape, turf grass, and urban environments.



Graphic: Surendra Dara

Infection routes of entomopathogens

Entomopathogen groups

Important entomopathogen groups and the modes of their infection process are described below.

Bacteria

There are spore-forming bacterial entomopathogens such as *Bacillus* spp., *Paenibacillus* spp., and *Clostridium* spp, and non-spore-forming ones that belong to the genera *Pseudomonas*, *Serratia*, *Yersinia*, *Photobacterium*, and *Xenorhabdus*. Infection occurs when bacteria are ingested by susceptible insect hosts. *Pseudomonas*, *Serratia* and *Yersinia* are not registered in the USA for insect control. Several species of the soilborne bacteria, *Bacillus* and *Paenibacillus* are pathogenic to coleopteran, dipteran, and lepidopteran insects. *Bacillus thuringiensis* subsp. *aizawai*, *Bt* subsp. *kurstaki*, *Bt* subsp. *israelensis*, *Bt* subsp. *sphaericus*, and *Bt* subsp. *tenebrionis* are effectively used for controlling different groups of target insects.

For example, *Bt* subsp. *aizawai* and *Bt* subsp. *kurstakiare* effective against caterpillars, *Bt* subsp. *israelensis* and *Bt* subsp. *sphaericus* target mosquito larvae, and *Bt* subsp. *tenebrionis* is effective against some coleopterans.

When *Bt* is ingested, alkaline conditions in the insect gut (pH 8-11) activate the toxic protein (delta-endotoxin) that attaches to the receptors sites in the midgut and creates pore in midgut cells. This leads to the loss of osmoregulation, midgut paralysis, and cell lysis. Contents of the gut leak into insect's body cavity (hemocoel) and the blood (hemolymph) leaks into the gut disrupting the pH balance. Bacteria that enter body cavity cause septicemia and eventual death of the host insect. Insects show different kinds of responses to *Bt* toxins depending on the crystal proteins (delta-endotoxin), receptor sites, production of other toxins (exotoxins), and requirement of spore. The type responses below are based on the susceptibility of caterpillars to *Bt* toxins.

Type I response – Midgut paralysis occurs within a few minutes after delta-endotoxin is ingested. Symptoms include cessation of feeding, increase in hemolymph pH, vomiting, diarrhea, and sluggishness. General paralysis and septicemia occur in 24-48 hours resulting in the death of the insect. Examples of insects that show Type I response include silkworm, tomato hornworm, and tobacco hornworm.

Type II response – Midgut paralysis occurs within a few minutes after the ingestion of delta-endotoxin, but there will be no general paralysis. Septicemia occurs within 24-72 hours. Examples include inchworms, alfalfa caterpillar, and cabbage butterfly.

Type III response – Midgut paralysis occurs after delta-endotoxin is ingested followed by cessation of feeding. Insect may move actively as there will be no general paralysis. Mortality occurs in 48-96 hours. Higher mortality occurs if spores are ingested. Insect examples include Mediterranean flour moth, corn earworm, gypsy moth, spruce budworm.

Type IV response – Insects are naturally resistant to infection and older instars are less susceptible than the younger ones. Midgut paralysis occurs after delta-endotoxin is ingested followed by cessation of feeding. Insect may move actively as there will be no general paralysis. Mortality occurs in 72-96 or more hours. Higher mortality occurs if spores are ingested. Cutworms and armyworms are examples for this category.

Unlike caterpillars, the response in mosquitoes is different where upon ingestion of *Bt* subsp. *israelensis* delta-endotoxin, the mosquito larva is killed within 20-30 min.

While *Bt* with its toxic proteins is very effective as a biopesticide against several pests, excessive use can lead to resistance development. Corn earworm, diamondback moth, and tobacco budworm are some of the insects that developed resistance to *Bt* toxins. Genetic engineering allowed genes that express *Bt* toxins to be inserted into plants such as corn, cotton, eggplant, potato, and soybean and reduced the need to spray pesticides. However, appropriate management strategies are necessary to reduce insect resistant to *Bt* toxins in transgenic plants.

Paenibacillus popilliae is commonly used against Japanese beetle larvae and known to cause the milky spore disease. Although *Serratia* is not registered for use in the USA, a species is registered for use against a pasture insect in New Zealand. In the case of *Photorhabdus* spp. and *Xenorhabdus* spp., which live in entomopathogenic nematodes symbiotically, bacteria gain entry into the insect host through nematodes. Biopesticides based on heat-killed *Chromobacterium subtsugae* and *Burkholderia rinojensis* are reported to have multiple modes of action and target mite and insect pests of different orders.

Fungi

Entomopathogenic fungi typically cause infection when spores come in contact with the arthropod host. Under ideal conditions of moderate temperatures and high relative humidity, fungal spores germinate and breach the insect cuticle through enzymatic degradation and mechanical pressure to gain entry into the insect body. Once inside the body, the fungi multiply, invade the insect tissues, emerge from the dead insect, and produce more spores. Natural epizootics of entomophthoralean fungi such as *Entomophaga maimaiga* (in gypsy moth), *Entomophthora muscae* (in flies), *Neozygites fresenii* (in aphids), *N. floridana* (in mites), and *Pandora neoaphidis* (in aphids) are known to cause significant reductions in host populations. Although these fastidious fungi are difficult to culture in artificial media and do not have the potential to be sold as biopesticides they are still important in natural control of some pest species. Hypoclealean fungi such as *Beauveria bassiana*, *Isaria fumosorosea*, *Hirsutella thompsonii*, *Lecanicillium lecanii*, *Metarhizium acridum*, *M. anisopliae*, and *M. brunneum*, on the other hand, are commercially sold as biopesticides in multiple formulations around the world. Fungal pathogens have a broad host range and are especially suitable for controlling pests that have piercing and sucking mouthparts because spores do not have to be ingested. However, entomopathogenic fungi are also effective against a variety of pests such as wireworms and borers that have chewing mouthparts.

Related to fungi, the spore-forming microsporidium, *Paranosema (Nosema) locustae* is a pathogen that has been used for controlling locusts, grasshoppers, and some crickets. When *P. locustae* is ingested, the midgut tissues become infected, followed by infection in the fat body tissues. The disease weakens and eventually kills the orthopteran host within a few weeks.

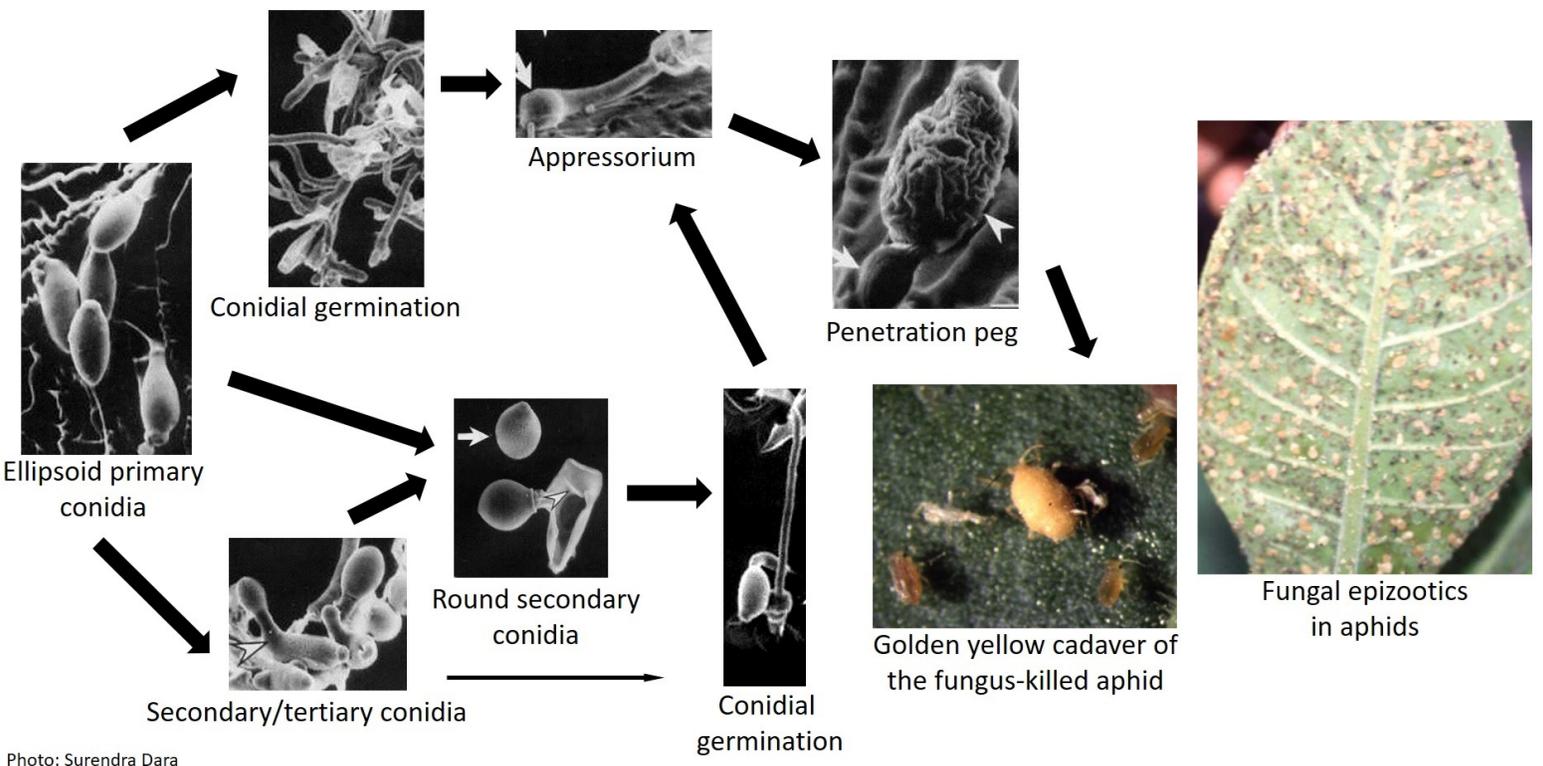


Photo: Surendra Dara

Pandora neoaphidis* conidial germination and infection in *Myzus persicae

Primary conidia

Secondary conidia

Secondary / Tertiary capilliconidia

Penetration of capilliconidium through mite leg

Healthy plant

Plant damaged by mites

Sporulation

Sporulating mummy

Mummy

Cassava Green Mites

Conidiation

Conidiophoration

Host invasion

Hyphal body multiplication

Hyphal body elongation

Life Cycle of *Neozygites floridana* in Cassava Green Mite

Primary conidium discharged from the sporulating mummified mite will produce either a similar *secondary conidium* or an almond shaped *capilliconidium*. *Capilliconidium* may further give rise to *secondary* and *tertiary capilliconidia*. *Capilliconidium* is the infective structure that attaches itself, with the help of a glue like haptor at its apex, to the mite and penetrates the mite body. Once the pathogen enters the host, it divides and multiplies producing *hyphal bodies* that invade the host body. Later on *hyphal bodies* transform into *conidiophores* that bear *primary conidia* and eventually breach through the host integument and release *primary conidia*.



Isaria fumosorosea-Bagrada bug



Beauveria bassiana-Bagrada bug



Metarhizium brunneum-Bagrada bug



Beauveria bassiana-Lygus bug



Beauveria bassiana-GWSS



Metarhizium brunneum-GWSS



Paecilomyces sp.-Western harvester ant



Beauveria bassiana-Western harvester ant



Entomophthora sp.-Strawberry aphid

Photo: Surendra Dara

Various insects killed by different species of entomopathogenic fungi Nematodes

Entomopathogenic nematodes are microscopic, soil-dwelling worms that are parasitic to insects. Several species of *Heterorhabditis* and *Steinernema* are available in multiple commercial formulations, primarily for managing soil insect pests. Infective juveniles of entomopathogenic nematodes actively seek out their hosts and enter through natural openings such as the mouth, spiracles, and anus or the intersegmental membrane.

Once inside the host body, the nematodes release symbiotic bacteria that kill the host through bacterial septicemia. *Heterorhabditis* spp. carry *Photorhabdus* spp. bacteria and *Steinernema* spp. carry *Xenorhabdus* spp. bacteria. *Phasmarhabditis hermaphrodita* is also available for controlling slugs in Europe, but not in the USA.



Photo: Lynn LeBeck

Infective juvenile of *Steinernema carpocapsae* entering the first instar larva of a leafminer through its anus.



Photo: Arnold Hara



Photo: Ray Akhurst

Nematodes in beet armyworm pupa (left) and termite worker (right).

Viruses

Similar to bacteria, entomopathogenic viruses need to be ingested by the insect host and therefore are ideal for controlling pests that have chewing mouthparts. Several lepidopteran pests are important hosts of baculoviruses including nucleopolyhedroviruses (NPV) and granuloviruses (GV). These related viruses have different types of occlusion bodies in which the virus particles (virions) are embedded. Virus particles invade the nucleus of the midgut, fat body or other tissue cells, compromising the integrity of the tissues and liquefying the cadavers. Before death, infected larvae climb higher in the plant canopy, which aids in the dissemination of virus particles from the cadavers to the lower parts of the canopy.

This behavior aids in the spread of the virus to cause infection in healthy larvae. Viruses are very host specific and can cause significant reduction of host populations. Examples of some commercially available viruses include *Helicoverpa zea* single-enveloped nucleopolyhedrovirus (HzSNVP), *Spodoptera exigua* multi-enveloped nucleopolyhedrovirus (SeMNPV), and *Cydia pomonella* granulovirus (CpGV).

Most entomopathogens typically take 2-3 days to infect or kill their host except for viruses and *P. locustae* which take longer. Compared to viruses (highly host specific) and bacteria (moderately host specific), fungi generally have a broader host range and can infect both underground and aboveground pests. Because of the soil-dwelling nature, nematodes are more suitable for managing soil pests or those that have soil inhabiting life stages.

Microbial control agent	Tradenames of biopesticides	Target pests
Bacteria		
<i>Bacillus thuringiensis</i> subsp. <i>aizawai</i>	Agree WG and XenTari DF	Lepidoptera
<i>B. thuringiensis</i> subsp. <i>israelensis</i>	Mosquito Beater WSP	Diptera
<i>B. thuringiensis</i> subsp. <i>kurstaki</i>	CoStar, DiPel ES, Monterey B.t., and Thuricide	Lepidoptera
<i>B. thuringiensis</i> subsp. <i>tenebrionis</i>	Novodor FC	Coleoptera
<i>Paenibacillus popilliae</i>	Milky Spore Powder	Japanese beetle, <i>Popillia japonica</i>
Fungi		
<i>Beauveria bassiana</i>	BotaniGard ES, Mycotrol-ESO, Myco-Jaal, and Naturalis-L	One or more pests of Acarina, Coleoptera, Diptera, Hemiptera, Hymenoptera, Lepidoptera, Orthoptera, Thysanoptera, and others
<i>Hirsutella thompsonii</i>	ABTEC Hirsutella	
<i>Isaria fumosorosea</i>	NoFly WP and Pfr-97 WDG	
<i>Lecanicillium lecanii</i>	Phule Bugicide	
<i>L. longisporum</i>	Vertalec	
<i>Metarhizium anisopliae</i>	BioCane, Metarril and Ory-X	
<i>M. brunneum</i>	Met52 EC	Plant-parasitic nematodes
<i>Paecilomyces lilacinus</i>	MeloCon WG	
Nematodes		
<i>Heterorhabditis bacteriophora</i>	Nemasys and Terranem	Several orders of soilborne pests
<i>Steinernema carpocapsae</i>	Ecomask and NemAttack	
<i>S. feltiae</i>	Entonem, Fungus Gnat & Rootknot Exterminator, and Scanmask	
<i>H. heliothidis</i> and <i>S. carpocapsae</i>	Double-Death	
Viruses		
Granulovirus (GV)		
<i>Cydia pomonella</i> GV	CYD-X and MADEX HP	Lepidoptera
Nucleopolyhedrovirus (NPV)		
<i>Helicoverpa zea</i> NPV	Gemstar LC	
<i>Spodoptera exigua</i> NPV	Spod-X LC	

Biopesticides based on various entomopathogenic microorganisms and their target pests

Microbial control and Integrated Pest Management

There are several examples of entomopathogen-based biopesticides that have played a critical role in pest management. Significant reduction in tomato leaf miner, *Tuta absoluta*, numbers and associated yield loss was achieved by *Bt* formulations in Spain (Gonzalez-Cabrera et al, 2011). *Bt* formulations are also recommended for managing a variety of lepidopteran pests on blueberry, grape, and strawberry (Haviland, 2014; Zalom et al, 2014; Bolda and Bettiga, 2014; Varela et al, 2015).

Lecanicellium muscarium-based formulation reduced greenhouse whitefly (*Trialeurodes vaporariorum*) populations by 76-96% in Mediterranean greenhouse tomato (Fargues et al, 2005). In other studies, *B. bassiana* applications resulted in a 93% control of twospotted spider mite (*Tetranychus urticae*) populations in greenhouse tomato (Chandler et al, 2005) and 60-86% control on different vegetables (Gatarayaha et al, 2010). The combination of *B. bassiana* and azadirachtin reduced rice root aphid (*Rhopalosiphum rufiabdominale*) and honeysuckle aphid (*Hyadaphis foeniculi*) populations by 62% in organic celery in California (Dara, 2015a). *Chromobacterium subtsugae* and *B. rinojensis* caused a 29 and 24% reduction, respectively, in the same study. IPM studies in California strawberries also demonstrated the potential of entomopathogenic fungi for managing the western tarnished plant bug (*Lygus hesperus*) and other insect pests (Dara, 2015b, 2016). Entomopathogenic fungi also have a positive effect on promoting drought tolerance or plant growth as seen in cabbage (Dara et al, 2016) and strawberry (Dara, 2013) and antagonizing plant pathogens (Dara et al, 2017)

Application of SeMNPV was as efficacious as methomyl and permithrin in reducing beet armyworms (*S. exigua*) in head lettuce in California (Gelernter et al, 1986). Several studies demonstrated PhopGV as an important tool for managing the potato tuber moth (*Phthorimaea operculella*) (Lacey and Kroschel, 2009).

The entomopathogenic nematode, *S. feltiae*, reduced raspberry crown borer (*Pennisetia marginata*) populations by 33-67% (Capinera et al, 1986). For managing the branch and twig borer (*Melagus confertus*) in California grapes, *S. carpocapsae* is one of the recommended options (Valera et al, 2015).

Entomopathogens can be important tools in IPM strategies in both organic and conventional production systems. Depending on the crop, pest, and environmental conditions, entomopathogens can be used alone or in combination with chemical, botanical pesticides or other entomopathogens.

Acknowledgements: Thanks to Dr. Harry Kaya for reviewing this article.

References

- Bolda, M. P. and L. J. Bettiga. 2015. UC IPM Pest Management Guidelines: Caneberries. UC ANR Pub. 3437.
- Capinera, J. L., W. S. Cranshaw, and H. G. Hughes. 1986. Suppression of raspberry crown borer *Pennisetia marginata* (Harris) (Lepidoptera: Sesiidae) with soil applications of *Steinernema feltiae* (Rhabditida: Steinernematidae). J. Invertebr. Pathol. 48: 257-258.
- Chanlder, D., G. Davidson, and R. J. Jacobson. 2005. Laboratory and glasshouse evaluation of entomopathogenic fungi against the two-spotted spider mite, *Tetranychus urticae* (Acari: Tetranychidae), on tomato, *Lycopersicon esculentum*. Biocon. Sci. Tech. 15: 37-54.
- Dara, S. K. 2013. Entomopathogenic fungus *Beauveria bassiana* promotes strawberry plant growth and health. UCANR eJournal Strawberries and Vegetables, 30 September, 2013. (<http://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=11624>)
- Dara, S. K. 2015a. Reporting the occurrence of rice root aphid and honeysuckle aphid and their management in organic celery. UCANR eJournal Strawberries and Vegetables, 21 August, 2015. (<http://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=18740>)
- Dara, S. K. 2015b. Integrating chemical and non-chemical solutions for managing lygus bug in California strawberries. CAPCA Adviser 18 (1) 40-44.
- Dara, S. K. 2016. IPM solutions for insect pests in California strawberries: efficacy of botanical, chemical, mechanical, and microbial options. CAPCA Adviser 19 (2): 40-46.

Dara, S. K., S.S.R. Dara, and S.S. Dara. 2016. First report of entomopathogenic fungi, *Beauveria bassiana*, *Isaria fumosorosea*, and *Metarhizium brunneum* promoting the growth and health of cabbage plants growing under water stress. UCANR eJournal Strawberries and Vegetables, 19 September, 2016. (<http://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=22131>)

Dara, S.S.R., S. S. Dara, S. K. Dara, and T. Anderson. 2017. Fighting plant pathogenic fungi with entomopathogenic fungi and other biologicals. CAPCA Adviser 20 (1): 40-44.

Fargues, J., N. Smits, M. Rougier, T. Boulard, G. Rdray, J. Lagier, B. Jeannequin, H. Fatnassi, and M. Mermier. 2005. Effect of microclimate heterogeneity and ventilation system on entomopathogenic hyphomycete infection of *Trialeurodes vaporariorum* (Homoptera: Aleyrodidae) in Mediterranean greenhouse tomato. Biological Control 32: 461-472.

Gatarayaha, M. C., M. D. Laing, and M. Ray. 2010. Effects of adjuvant and conidial concentration on the efficacy of *Beauveria bassiana* for the control of the two-spotted spider mite, *Tetranychus urticae*. Exp. Appl. Acarol. 50: 217-229.

Gelernter, W. D., N. C. Toscano, K. Kido, and B. A. Federici. 1986. Comparison of a nuclear polyhedrosis virus and chemical insecticides for control of the beet armyworm (Lepidopter: Noctuidae) on head lettuce. J. Econ. Entomol. 79: 714-717.

González-Cabrera, J., J. Mollá, H. Monton, A. Urbaneja. 2011. Efficacy of *Bacillus thuringiensis* (Berliner) in controlling the tomato borer, *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae). BioControl 56: 71–80.

Haviland, D. R. 2014. UC IPM Pest Management Guidelines: Blueberry. UC ANR Pub. 3542.

Lacey, L. A. and J. Kroschel. 2009. Microbial control of the potato tuber moth (Lepidoptera: Gelechiidae). Fruit Veg. Cereal Sci. Biotechnol. 3: 46-54.

Varela, L. G., D. R. Haviland, W. J., Bentley, F. G. Zalom, L. J. Bettiga, R. J. Smith, and K. M. Daane. 2015. UC IPM Pest Management Guidelines: Grape. UC ANR Pub. 3448.

Zalom, F. G., M. P. Bolda, S. K. Dara, and S. Joseph. 2014. UC IPM Pest Management Guidelines: Strawberry. UC ANR Pub. 3468.



BioNatural Healing College

BioNatural Healing College (BNHC)

**BNHC OFFERS ONLINE 5
DIPLOMAS UNDER A
QUALIFIED PROFESSOR
(30 credits per diploma)**

- 1. Herbal Science &
Master Herbalist**
- 2. Holistic Health
Practitioner**
- 3. BioNatural Pest
Management**
- 4. Nutrition & Brain
Function**
- 5. BioNatural Health
Practitioner**

BioNatural Healing College (BNHC) OFFERS CONTINUING EDUCATION

**IN-PERSON SEMINARS
AS WELL AS ONLINE
FOR CALIFORNIA
DEPARTMENT OF
PESTICIDE
REGULATION**

**DATES: 2/22/23, 4/26/23,
5/30/23, 6/27/23, 7/27/23,
8/20/23, 9/28/23, 10/26/23,
11/21/23, 12/19/23**

**Location: Pomona,
California**

**FOR MORE
INFORMATION PLEASE
CONTACT US: PH: 909-
242-6342**

**CONTACT US: PH: 909-242-6342 OR
EMAIL: info@bionaturalhealingcollege.org
www.bionaturalhealingcollege.org**



BioNatural Healing College

BIONATURAL HEALING COLLEGE (BNHC)

ONLINE EDUCATION

***LEARN, APPLY
AND SHARE THE
KNOWLEDGE TO
THE BENEFIT OF
HUMANITY.***

BIONATURAL HEALING COLLEGE (BNHC) ONLINE EDUCATION

**Convenient to start at any
time from your comfort
zone.**

**Reasonable tuition fee with
option plans available.**

**Contact Us: Ph: (909) 242-
6342**

Email:

info@bionaturalhealingcollege.org

www.bionaturalhealingcollege.org

CONTACT US: PH: 909-242-6342 OR

EMAIL: info@bionaturalhealingcollege.org



Mission: BioNatural Healing College is a non-profit public benefit institution that has tax-exempt status under the Internal Revenue Service, Section 501(c)(3) of the United States of America. Our goal is to offer a high-quality education a diploma program as well as holistic health and nutrition conferences, seminars, workshop, and continuing education. The focus of these educational programs is to offer healing and holistic nutrition science through online distance learning. These dynamic online education programs will provide diverse adult learners throughout the world the experience of enhancing their quality of life, their health, and their happiness.

Vision: The faculty, staff and management team of BioNatural Healing College are passionately committed to providing the best teaching possible in this field. We seek to encourage, motivate and explain the importance of this field to prospective students so that they may make an informed decision regarding enrollment. We seek an ultimate goal of satisfaction for the student based on responsibility, commitment, respect, awareness and sustainable education for society.

Accreditation and Recognition: BioNatural Healing College is based in California. It is an institution that has the goal to deliver on- demand online distance learning around the globe. This education is of high quality and vocational in nature. BioNatural Healing College is a legal business entity that has been approved to operate by the State of California's Bureau for Private Postsecondary Education that set forth in the educational code. BioNatural Healing College is not accredited by the United States Department of Education. BioNatural Healing College is a member of the American Holistic Health Association (AHHA).

