DEPARTMENT OF ENTOMOLOGY
BANGLADESH AGRICULTURAL UNIVERSITY
MYMENSINGH
Curriculum for M.S. in Entomology

Existing

(Running from 2014)

July-December (October-March) Semester			
Compulsory Courses		**(8 credits)**	
Course No.	Title of Course		Credits
ENTOM. 501	Insect Taxonomy		2
ENTOM. 503	Insect Physiology		2
ENTOM. 505	Insect Ecology		2
ENTOM. 507	Pesticide Management		2
Elective Courses		**(4 credits)**	
ENTOM. 517	Insect Biodiversity and Evolution		2
ENTOM. 519	Storage Entomology		2
ENTOM. 529	Insect Biotechnology		2
ENTOM. 531	Acarology		2
STAT. 545	Experimental Design		2
ENTOM 504	Research work	**(3 credits)**	3 (S/U)
Total Credit			15
January-June (April-September) Semester			
Compulsory Courses		**(8 credits)**	
Course No.	Title of Course		Credits
ENTOM. 509	Insect Nutrition & Biochemistry		2
ENTOM. 511	Insect Pest Management		2
ENTOM. 513	Insect Pathology		2
ENTOM. 515	Entomological Technique		1
ENTOM. 502	Practice in Entomological Technique		1
Elective Courses		**(4 credits)**	
ENTOM. 521	Insecticide Toxicology		2
ENTOM. 523	Industrial Entomology		2
ENTOM. 525	Insect Morphology		2
ENTOM. 527	Chemical Ecology		2
ENTOM 504	Research work	**(3 credits)**	3 (S/U)
Total Credit			15
Thesis Semester			
Course No.	Title of Course		Credit hr.
ENTOM. 504	Research work	(2 credits)	2 (S/U)
ENTOM. 506	Evaluation of Thesis	(5 credits)	5
ENTOM. 508	Thesis Defense	(3 credits)	3
Total Credit			10
Grand Total			40

Odd number = Theory ; Even Number = Practical
S = Satisfactory ; U = Unsatisfactory

Head/Chairman, Board of Studies
Department of Entomology
Bangladesh Agricultural University
Mymensingh

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Syllabus for M.S. in Entomology
Course No. ENTOM. 501 : Insect Taxonomy
Credit hour : 2

1. International Rules of Zoological Nomenclature: Historical and philosophical basis of nomenclature; origin of the binomial system, international codes of nomenclature, international commission; type, method and its significance; formation of generic names, specific trivial names and intraspecific names.
2. Taxonomic categories and species concept: Concepts and their application; theories of biological classification, taxonomic problems with closely related species.
3. Taxonomic characters, collections and identifications. Taxonomic significance of the character of immature insects.
4. Insect molecular systematics, introduction, genetic linkage mapping in insects, improved technologies for genomic mapping.
5. Major types of variation within a single population. An evolutionary and applied perspective of insect biotypes.
6. Chaetotaxonomy, chemotaxonomy and numerical taxonomy.
7. Taxonomic publications and literatures: Synopsis and reviews, revisions, monographs, atlases, faunal works, field guides and manuals, handbooks, catalogues, checklists, descriptions of new taxa, evolutionary and biological publications.

Books Recommended :

Text Books

Mayr, E. 1960. Principles of Systematic Zoology. McGraw-Hill Book Co., New York.
Mayr, E. Linsley, E.G. and Usinger, R.L. 1953. Methods and Principles of Systematic Zoology. McGraw-Hill Book Co., New York.
Sokal, R.R. and Sneath, P.H.A. 1963. Principles of Numerical Taxonomy, W.H. Freeman and Co. San Francisco.

Reference Books

Abivardi, C. 1999. Iraian Entomology. Vol. 1, Springer, Netherlands.
Bisby, F.A. Vaughan, J.G. and Wright, C.A. 1980. Chaemosystematics, Principles and Practices. Academic Press, New York.
Chamberlin, W.J. 1952. Entomological nomenclature and literature. Wn. C. Brown, Dubuque, Iowa.
Goto, H.E. 1982. Animal Taxonomy, Edward Arnold, London.
Kapoor, V.C. 1990. Origin and Evolution of Insects. Publ. Kallayani, New Delhi.
Kim, E.E.C. and McPheron, B.A. 1993. Evolution of insect pests-Patterns and variation. Intercept Ltd., London.
Leone, C.A. 1964. Taxonomic Biochemistry and Serology. Ronald Press, Kansas.
Lincoln, R.J. Boxshall, G.A. and Clark, P.F. 1981. A Dictionary of Ecology, Evolution and Systematics. Cambridge Univ. Press, Cambridge.

Syllabus for M.S. in Entomology
Course No. ENTOM. 503: Insect Physiology
Credit hour: 2

1. Digestive system: Structure and functions of alimentary canal and salivary gland, types of alimentary canal
2. Circulatory system: Insect blood, circulatory organs, circulation of blood in main body and appendages.
3. Excretory system: Concept, excretory products, excretory organs and their role in excretion, salt and water balance.
4. Respiratory system: Tracheal system, respiration in terrestrial, aquatic and endoparasitic insects.
5. Exocrine and endocrine glands: Exocrine glands, types, secretions and functions, Endocrine glands- neurosecretory cells, corpora cardiac, corpora allata and thoracic glands.
6. Insect hormone: Types of insect hormone and their role in insect growth and development.
7. Mascular system and locomotion: Insect muscle-structure and physiology. Locomotion- movement on substrate and water. Flight activity.
8. Insect behavior: Orientation, food selection and feeding behavior, mating and ovipostion behavior. Molecular genetics of insect behavior.
9. Insect growth: Embryonic and post-embryonic development in insect. Genetic control of embryonic development and sex-determination.

Books Recommended:

Text Books

Evans 1994. Advances in Insect Physiology. Vol. 25, Intercept Ltd., London.
Patton, H.R. 1963. Introductory insect physiology. Saundres, Phila.
Rodder, K.D. 1963. Insect Physiology. John Wiley, New York.
Wigglesworth, V.B. 1967. The Principles of Insect Physiology. Mathuen and Co., London.

Reference Books

Borkovee, A.B. and T.J. Kelly. 1984. Insect Neurochemistry and Neurophysiology. Plenum Press, No. 1, London.
Bhaskarau, G., Friedman, S. and Rodgriguez, J.G. 1981. Current topics of insect endocrinology and nutrition. Plenum Publ. Crop., New York.
Borror, D.J., Delong, D.M. and Triplehorn, C.A. 1976. An introduction to the study of insects. Holt. Rinchart and Winston, New York.
Frederik, H. and Jhout, N.I. 1994. Insect hormones. Intercept Ltd., London.
Gilmour, D. 1966. The metabolism of insects. Oliver and Boyd., London.
Hoy, M. A. 2003. Insect molecular genetics. An introduction to principles and applications. Academic Press, New York.
Imm's, A.D. 1957. A general textbook of Entomology. Mathuen and Co., London.
Nordland, D.A. 1981. Semiochemicals. Edited by D.A. Nordland, R.L. Jones and E.J. Lewis. Wiley, New York.
Novak, V.J.A. 1966. Insects hormones. Mathuen and Co., London.
Richards, O.W. and Davis, R.G. 1977. Imm's General Textbook of Entomology. Vols. I&II. Chapman and Hall, London.
Ross, H.H. 1965. A Textbook of Entomology. John Wiley, New York.
Shorey, H.H. and J.J. Mekelvey, Jr. 1977. Chemical control of insect behaviour. Theory and application. John Wiley & Sons.

Syllabus for M.S. in Entomology
Course No. ENTOM. 505: Insect Ecology
Credit hour: 2

1. Population Ecology: Role of density- independent and density- dependent factors of environment on the population of insects. Population growth, life tables, population modeling.
2. Insect Dispersal and Dispersion: Concept of dispersal, dispersal by wind, dispersal in response to crowding, dispersal in relation to distribution and abundance, migration, concept of dispersion and mathematical distribution.
3. Interactions: Intra- and inter-specific competition, predator-prey and parasite-host interactions, mutualistic associations.
4. Community of insects: Community development, structure and organization, factors of community development, diversity and stability.
5. Ecological Genetics: Genetic polymorphism- Balanced and transient polymorphism, mimetic polymorphism, enzymatic polymorphism and genetic variation in populations, industrial melanism.
6. Insect population estimation: Methods of insect population estimation-marking techniques and capture- recapture methods.

Books Recommended :

Text Books

Allee, W.C., Park, O., Emerson, R.E., Park, T. and Schnidt, K.P. 1961. Principles of Animal Ecology.
Andrewartha, H.G. and L.C. Birch. 1970. The Distribution and Abundance of Animals. The University of Chicago Press Ltd., London.
Price, P.W. 1984. Insect Ecology (Second ed.), John Wiley and Sons, New York, Chichester, Brisbane, Toronto, Singapore.
Southwood, T.R.E. 1967. Ecological Methods. Methuen and Co., London.

Reference Books

Andrewartha, R.G. 1961. Introduction to the study of animal populations. Methuen and Co., London.
Bell, W.J. and R.T. Carde, 1984. Chemical Ecology of insects. Chapman and Hall, London and New York.
Bernays, E.A. 1994. Insect plant interactions. Vol. 5, Intercept Ltd., London.
Carde, R.T. and Bell, W. 1995. Chemical ecology of insects. 2nd edition. Intercept Ltd., London.
Clark, L.A., Caiger, P.M., Hudhes, D. and Morris, R.E. 1968. The Ecology of Insect Populations in Theory and Practice. Methuen and Co., London.
Colinavaux, P.A. 1973. Introduction to Ecology. John Wiley and Sons, New York, Chichester, Brisbane, Toronto.
Elton, C.S. 1966. The Pattern of Animal Communications. Methuen and Co., London.
Ford, E.B. 1964-1975. Ecological genetics. Methuen and Co., London.
Kormondy, E.J. 1965. Readings in Ecology. Prentice Hall, Inc. New York.
Leather, S., Walters, K., Kills, N. and Watt, A. 1994. Individuals, populations and patterns in ecology. Intercept Ltd., London.
Lewis, T. and L.R. Taylor. 1968. Introduction to Experimental Ecology. Methuen Co., London.
Lincoln, R.J., Boxshall, G.A. and Clark, P.F. 1981. A Dictionary of Ecology, evaluation and systematics. Cambridge Univ. Press, Cambridge.
Phillipson, J. 1969. Ecological Energetics studies in Biology, No. 1. Edward Arnold Ltd., London.
Thompson, M.R.C. 1968. Ecology of insect vector population. Academic Press, New York.
Watt, R.E.F. 1966. Systems Analysis in Ecology. Academic Press, New York.

Syllabus for M.S. in Entomology

Course No. ENTOM. 507: Pesticide Management

Credit hour: 2

1. Pesticides in Agroecosystem: Agro ecosystem and its structure with phenomenon, selection and use of pesticides in crop pest management, factors influencing the effectiveness of insecticides, limitation of pesticides- pest resurgence, secondary pest's outbreak, adverse effects on beneficial species, effects of pesticides on function and structure of ecosystems, use of pesticide for economic gain.
2. Formulation and Quality Control of Pesticides: Formulation of insecticides and its role in insect pest management, toxicity rating of pesticides. Registration, import, stocking, labeling, handling of pesticides, international rules of quality control.
3. Pesticide Application Techniques: Pesticide application methods, movement, measurement and sampling of spray droplets and aerial droplets size and drift control of pesticide droplets.
4. Bioassay of Pesticides: Purpose of bioassay, types of bioassays, determination of oral and dermal toxicities.
5. Pesticides in Environment: Pesticides residues and environmental pollution, residues and tolerance limit of pesticides, problems of pesticide residues, international rules of pesticides tolerance to non-target animals and humans.
6. Pesticide Dumping: Disposal of used containers and unused pesticides, merits and demerits of different categories of disposal of pesticide waste.

Books Recommended :

Text Books

Chichester, C.O. 1965. Research in pesticides. Academic press, New York.

Finney, D.J. 1964. Statistical method in biological assay, Second Edition, Charles Griffin & Company Ltd. 42, Drury Lane, London W.C.2.

Metcalf, R.L. 1966-70. Advances in Pest Control Research. Vols. 1,2,3,4 and 5. Interscience Publisher, New York and London.

Methews, G.A. 1985. Pesticide application methods, Longman, U.K.

Reference Books

Agarwal, R.A., Gupta, G.P., Kishore, P. and Chandra, D. 1983. Principles and concepts of Integrated Pest Management. ICAR, New Delhi, India.

Anonymous, 1985. Bangladesh Gazette. The Pesticide Rules. Ministry of Agriculture, Section-II. Bangladesh.

Aziz, A., Kadir, S.A. and Barlow, H.S. 1992. Pest Management and their environment in 2000. Intercept Ltd., Lodon.

Busvine, J.R. 1971. A Critical Reviews of the Techniques for Testing insecticides. C.I.E., London.

Chottopadhyay, S.B. 1989. Principles and Procedures of Plant Protection. Oxford and IBH Publishing Pvt. Ltd., New Delhi.

Gunther, F.A. 1968-69. Residue Reviews. Vols. 25-30. Springer-Verlag, New York.

Heliovaara, K. and Vaisanen, R. 1993. Insects and Pollution. Intercept Ltd., London.

Finney, D.J. 1964. Probit analysis. Cambridge Univ. Press, Great Britain.

Mathews, G.A. and Hislop, E.C. 1993. Application technology for crop protection. Intercept Ltd. London.

Negherbon, W.O. 1959. Hand Book of Toxicology (Insecticides).

O-Brien, R.D. 1967. Insecticides Action and Metabolism. Academic Press, New York.

Otto, D. and Weber, B. 1992. Insecticides- Mechanism of action and resistance. Intercept Ltd., London.

Ramulu, U.S. 1979. Chemistry of insecticides and fungicides. Oxford and IBH Publ. Co., New Delhi, Bombay and Calcutta.

Ramulu, U.S. 1985. Methods of pesticides analysis. Oxford and IBH Publ. Co., New Delhi, Bombay and Calcutta.

Residue Reviews, 1969. Francis A. Gunther Springer-Verlag, New York.

The Fifth International Congress of Pesticide Chemistry-Abstracts. August 29-September 4, 1982. Kyoto, Japan.

Syllabus for M.S. in Entomology

Course No. ENTOM. 509: Insect Nutrition & Biochemistry

Credit hour: 2

1. Physical and Chemical Needs of Insects: Physical and chemical properties of insect diets. Qualitative and quantitative requirements of insect nutrition. Mineral nutrition for diseases and pest resistance.
2. Digestion and Absorption of Nutrients: Digestion and absorption of carbohydrates, proteins and amino acids, lipids, vitamins, minerals and nucleic acids.
3. Nutrition of Immature Insects: Phytophagous, domestic and stored product insects- their growth and development.
4. Artificial Diets: Qualitative and quantitative analysis of artificial diets for insect colonization and mass production.
5. Nutrient Metabolism: Metabolism of carbohydrates, protein and lipids. Energy metabolism- anaerobic and aerobic.
6. Pigment Metabolism: Metabolism of melanin, pterine, carotene and chlorophyll derivatives.

Books Recommended :

Text Books

Patton, H.R. 1963. Introductory Insect Physiology. Saunders, Phila.
Roder, K.D. 1963. Insect Physiology. John Wiley, New York.
Wigglesworth, V.B. 1967. The Principles of Insect Physiology. Mathuen and Co., London.

Reference Books

Downer, R.G.H. 1987. Energy metabolism in insects. Plenum Publ. Crop., New York.
Evans. 1994. Advances in Insect Physiology. Vol. 25, Intercept Ltd., London.
Gilmour, D. 1961. Biochemistry of insects. Academic Press.
Gilmour, D. 1966. The metabolism of insects. Oliver and Boyd., London.
House, H.L. 1972. Insect Nutrition. In. R.N. Fiennes (ed.). Biology of Nutrition. Vol. 18, Chapter 17. Pergamon Press. Oxford and New York.
Islam, B.N. 1981. Improvement of Silkworm Multiplication and Silk Production under Bangladesh Condition. Dept. of Entomology, BAU, Mymensingh.
King, E.G. and Leppla, N.C. 1984. Advances and Challenges in Insect Rearing. ARS-USDA, USA.
Krishna, K. and F.M. Weesner. 1969. Biology of Termites. Vols. 1&2. Academic Press, New York.
Phillipson, J. 1966. Ecological Energetics. Studies in Biology No. 1. Edward Arnold Ltd., London.
Smith, C.N. 1966. Insect Colonization and mass production. Academic Press, New York and London.

Syllabus for M.S. in Entomology

Course No. ENTOM. 511: Insect Pest Management

Credit hour: 2

1. Need for Pest Management Concepts: Philosophy, components and tools in pest management, agro ecosystem - factors affecting pest incidence, organization of pest surveillance programme. ecological aspects of Pest management, economics of pest management - economic threshold and economic injury level.
2. Management Tactics: The principles of pest control, ecology and economics in the management of pests across multiple systems.
   Plant resistance: Components, mechanism and development of insect resistant varieties.
   Biological control: Ecological background, advantages and disadvantages, procedures and techniques.
   Behavioural control: Use of semiochemicals- pheromones and allelochemicals and their constraints.
   Pesticidal control: Use of synthetic and natural pesticides in pest management.
3. Integrated Pest Management (IPM): Introduction to IPM. Interactions and compatibility of different tactics of pest management and cost benefit analysis. Synthesis of IPM system. Organization and implementation of IPM. Pest monitoring techniques and the application of computer technology to pest management.
4. Pest Management and Modeling: Modeling in pest management - Descriptive and mathematical models, system analysis, pest management system for important pests.

Books Recommended :

Text Books

Atwal, A.S. 1976. Agricultural pests of India and Southeast Asia. Kalyani Publishers, New Delhi.

Dent, D. 1991. Insect Pest Management. CAR International.

Kilgore, W.W. and Doutt, R.H. 1967. Pest Control, biological, physical, and selected chemical methods. Academic Press, New York.

Metcalf, R.L. and Luckmann, W.H. 1994. Introduction to insect pest management. John Wiley and Sons, New York.

Reference Books

Alam, M.Z. 1965. Modern insecticides and their uses. Agril. Inform. Serv., Publ., Dhaka.

Beirno, B.P. 1966. Pest Management. Leonard Hill Books, London.

Brown, A.W.A. 1961. Insect Control by chemicals. John Wiley, New York.

Van, den Bosch, R., Messenger, P.S. and Guitterrez, A.P. 1982. An Introduction to Biological Control. Plenum Press, New York.

Debach, P. 1964. Biological control of insect pests and weeds. Chapman and Hall, London.

Detheir, V.G. 1947. Chemical insect attractants and repellents. McGray Hill Book Co., New York.

Evens, J.W. 1987. Insect pest and their control. Soni Reprints Agency, Delhi.

Van Eden, H.F. 1989. Pest Control, Edward Arnold, London.

Flint, M.L. and Vaudeu-Bosch, R. 1981. Introduction to integrated pest management. Plenum Publ. Corp., New York.

Huffaker, C.B. and Messenger, P.S. 1990. Theory and Practice of Biological control. Academic Press, New York.

Labreque, G.C. and Smith, C.N. 1968. Principles of insect chemosterilants. North Holland Publ. Co., Amsterdan.

Metchel, E.R. 1981. Management of insect pests with semiochemicals concept and practices. Academic Press, New York.

Monro, H.A.U. 1961. Manual of fumigation for insect control. Oxford and IBH Publ. Co., N.Y.

Norton, G. A. and Mumford, J. D. 1993. Decision tools for pest management. Intercept Ltd, London.

Pruthi, H.S. 1969. Test book of agricultural Entomology. Indian Council of Agricultural Research, New Delhi.

Ridgway, R.L. and Vinson, S.B. 1977. Biological control of augmentation of natural enemies. Plenum Publ. Corp., New York.

Rosen, D., Bennett, F. D., Capinera, J. L. 1994. Pest management in the subtropics: Integrated Pest

Management. Intercept Ltd, London.
Rosen, D., Bennett, F. D., Capinera, J. L. 1994. Pest management in the subtropics: Biological control. Intercept Ltd, London.
Shapa, V.A. 1986. Biological Plant Protection Publ. Oxonian Prep. Pvt. Ltd., New York.
Shorey, H.H. and Mc.Kelvey, J.J.Jr. 1977. Chemical Control of Insect Behaviour. Theory and application. John Wiley Interscience Publ., N.Y.
Sweetman, H.L. 1958. The Principles of Biological Control. Wm.C. Brown, Dabuque, Iosa.

Syllabus for M.S. in Entomology

Course No. ENTOM. 513: Insect Pathology

Credit hour: 2

1. Introduction: Scope of insect pathology in Bangladesh.
2. Insect Diseases: Types of insect diseases; Etiology and Diagnosis of insect diseases.
3. Physiopathology: Portals of entry and mode of infection of microbial pathogens; Physio-pathology of insects infected with microbial pathogens.
4. Immunity in Insects: Types of immunity; Factors attributing immunity in insects; Mechanism of insect resistance to pathogens.
5. Microbial Pesticides: Present status of microbial pesticides; Methods of isolation, purification and counting of microbial pathogens from cultures/cadavers; Mass production technology of microbial pesticides. Potential microbial pathogens of Bangladesh. Safety of microbial pesticide.
6. Microbial Control: Role of microbial pathogens in pest management; Integration of microbial pathogens with other pest control tactics; Factors affecting efficacy of microbial pathogens; Approaches to microbial control; Application technology of microbial pathogens; Advantages and disadvantages of microbial control.
7. Epizootiology: Concept of epizootiology; Factors influencing on insect epizootiology.
8. Genetically Engineered Pathogens: Concept and present status. Genetic engineering of insect pathogens.

Books Recommended:

Text Books

Boucias, D. G. and Pendland, J. C. 1999. Principles of Insect Pathology. Kluwer Academic Publ., London.

Cantwell, G.E. 1974. Insect Diseases. Vols. 1&2. Marcel Dekker, New York.

Steinhaus, E.A. 1963. Insect Pathology: An Advanced Treatise. Vol. 1&2, Academic Press, New York.

Tanada, Y. and Kaya, H.K. 1993. Insect Pathology. Academic Press, San Diego, New York, Boston, London, Sydney, Tokyo, Toronto.

Reference Books

Baker, R. R. and Dunn, P. E. 1990. New directions in biological control. Alan R. Liss, New York.

Beckage, N.E., Thompson, S.N. and Federici, B.A. 1993. Parasites and pathogens of insects. Vol 1& 2, Intercept Ltd., London.

Bedding, R., Ackhurst, R. and Kaya, H. 1993. Nematodes and the biological control of insect pests. Intercept Ltd., London.

Bulla, L.A.Jr. and Chang, T.C. 1977. Comparative Pathology, Vols. 1,2&3, Plenum Press, New York and London.

Burges, H.D. 1981. Microbial control of Pests and Plant Diseases 1970-1980. Academic Press, New York.

Burges, H.D. and Hussey, N.W. 1971. Microbial control of Insects and Mites. Academic Press, New York.

Fuxa, J.R. and Tanada, Y. 1987. Epizootiology of Insect Diseases. John Wiley and Sons, New York, Chichester, Brisbane, Toronto, Singapore.

Gaugler, R. and Kaya, H.K. 1990. Entomopathogenic Nematodes in Biological control. CRC Press, Boca Raton, Florida.

Ignoffo, C.M. 1988. Microbial Insecticides. Part-A Entomogenous Protozoa and Fungi. CRC Handbook of Natural Pesticides, Vol. 5, CRC Press, Boca Raton, Florida.

Jackson, T.A. and Glare, T.R. 1992. Use of pathogens in scrab pest management. Intercept Ltd., London.

Kurstak, E. 1982. Microbial and Viral Pesticides. Marcel Dekker, New York.

Laird, M. Lacey, L. A. and Davidson, E. V. 1990. Safety of microbial insecticides. CRC Press, BocaRaton, Florida.

Maramorosch, K. and Shermam, K.E. 1985. Viral Insecticides for Biological Control. Academic Press, New York.

Smith, K.M. 1967. Insect Virology. Academic Press, New York and London.

Syllabus for M.S. in Entomology

Course No. ENTOM. 515: Entomological Technique

Credit hour : 1

1. Concept and Technique of Electron Microscopy: Introduction, preparative procedures, staining and examination procedures of slides.
2. Tissue Culture Technique: Introduction to tissue culture, procedure for preparation of tissue extracts, tissues, methods for culturing, histological techniques, photomicrography of tissue cultures and use of camera lucida.
3. Insect Population Density and Distribution Patterns: Sampling technique- Random and sequential samplings, binomial distribution and index of dispersion.
4. Radioisotopes and Radiation in entomology: methods of tagging insects with radioisotopes, radiation hazards and control measures, use of radioisotopes in entomological research.

Books Recommended:

Text Books

Ahmed, A.R., Bhuiya, A.A. and Reza, Z.A. 1999. Parishakhan: Tattwa and Proyog, Publisher- Shamsunnahar Ahmed and others.
Andrewartha, H.G. 1961. Introduction to the study of animal populations. Methuen & Co. Ltd., London.
Cameron, G. 1956. Tissue culture technique. Academic Press, New York.
Finney, D.J. 1964. Probit analysis. Cambridge Univ. Press, Great Britain.
Mary, F. G. 1960. Manual of histologic and special staining techniques.

Reference Books

Alfred, B. 1957. Laboratory directions for histological technique. Burgess Publ. Co., Mimmeapolis.
Davenpost, H.A. 1960. Histological and histochemical techniques.
Grimstone, A.V. 1976. The electron microscope in biology. Edward Arnold, London.
Ham, A.W. and D.H. Cormack. 1979. Histology. J.B. Lippincott., Phila (8th ed.).
Hoy, M.A. 1994. Insect Molecular Genetics. Intercept Ltd., London.
Leeson, C.R. 1976. Histology. Saunders, Phila.
Maramorosch, K. and McIntosh, A.H. 1994. Insect Cell Biotechnology. Intercept Ltd., London.
Maramorosch, K. and McIntosh, A.H. 1994. Arthropod Cell Culture System. Intercept Ltd., London.
Mercer, E.H. and Birbeck, M.S.C. 1961. Electron microscopy, a hand book for biologists. Blackwell, Oxford.
Pease, D.C. 1964. Histological techniques for electron microscopy. Academic Press, New York (2nd ed.).
Penso, G. and D. Balducci. 1963. Tissue Culture in Biological Research. Elsevier Publ. Amsterdam.
Ramulu, U.S.S. 1979. Methods of pesticide analysis. New Delhi and Oxford.
Sjostrand, F.S. 1967. Electron microscopy of cells and tissues. Academic Press, New York.
Tribe, M.A. and Others, 1975. Electron microscopy and cell structure. Cambridge Univ., London.
Weiss, L. and Green, R.O. 1977. Histology. McGraw Hill Book, New York.

Syllabus for M.S. in Entomology

Course No. ENTOM. 502: Practice in Entomological Technique

Credit hour: 1

1. Preparation of the fixatives and stains; processing insect tissue, preparation of insect muscles, nerves and trachea.
2. Microscope slide preparation procedure for processing specimens; mounting specimens and examine of slides.
3. Estimation of LD_{50} (median) and LD_{90} (optimum) values of different pesticides.
4. Measurement of insect population density in crop field.
5. Rearing techniques of insects for different biological research.
6. Preparation of project proposal, field trips and seminar presentation.

Books Recommended:

Text Books

Andrewartha, H.G. 1961. Introduction to the study of animal populations. Methuen & Co. Ltd., London.
Cameron, G. 1956. Tissue culture technique. Academic Press, New York.
Finney, D.J. 1964. Probit analysis. Cambridge Univ. Press, Great Britain.
Mary, F. G. 1960. Manual of histologic and special staining techniques.
Price, P.W. 1984. Insect Ecology (Second ed.), John Wiley and Sons, New York,
Southwood, T.R.E. 1967. Ecological Methods. Methuen and Co., London.

Reference Books

Alfred, B. 1957. Laboratory directions for histological technique. Burgess Publ. Co., Mimmeapolis.
Davenpost, H.A. 1960. Histological and histochemical techniques.
Grimstone, A.V. 1976. The electron microscope in biology. Edward Arnold, London.
Ham, A.W. and D.H. Cormack. 1979. Histology. J.B. Lippincott., Phila (8th ed.).
Hoy, M.A. 1994. Insect Molecular Genetics. Intercept Ltd., London.
Leeson, C.R. 1976. Histology. Saunders, Phila.
Maramorosch, K. and McIntosh, A.H. 1994. Insect Cell Biotechnology. Intercept Ltd., London.
Maramorosch, K. and McIntosh, A.H. 1994. Arthropod Cell Culture System. Intercept Ltd., London.
Pease, D.C. 1964. Histological techniques for electron microscopy. Academic Press, New York (2^{nd} ed.).
Penso, G. and D. Balducci. 1963. Tissue Culture in Biological Research. Elsevier Publ. Amsterdam.
Ramulu, U.S.S. 1979. Methods of pesticide analysis. New Delhi and Oxford.
Sjostrand, F.S. 1967. Electron microscopy of cells and tissues. Academic Press, New York.
Tribe, M.A. and Others, 1975. Electron microscopy and cell structure. Cambridge Univ., London.
Weiss, L. and Green, R.O. 1977. Histology. McGraw Hill Book, New York.

Syllabus for M.S. in Entomology

Course No. ENTOM. 517 : Insect Biodiversity and Evolution

Credit hour : 2

1. Fundamentals of insect taxonomic practice and Biodiversity - Describe how hexapods inform us about biodiversity and influence our conservation decisions, the latest developments in insect biodiversity research.
2. Taxonomic Study: Classification and phylogeny of insects, Apterygote and Palaeopteran orders, important genera and species of the orders of Orthoptera, Isoptera, Hemiptera, Thysanoptera, Coleoptera, Diptera, Lepidoptera and Hymenoptera.
3. Immature Stages: Types of insect larvae and pupae and their identification
4. Collection and Preservation: Collection and preservation methods, presentation of taxonomic findings, descriptions and keys.
5. Origin and Evolution: Insect taxonomy, evolutionary relationships and natural history, key innovations and life history strategies of major hexapod lineages.
6. Geological history and evolution of insect orders and metamorphosis.

Books Recommended :

Text Books

Alam, M.Z. 1967. A Report on the Survey of Insect and Mite Fauna of East Pakistan. Agril. Res. Inst. Publ., Dhaka.

Ball, G.E. 1985. Taxonomy, Phylogeny and Zoogeography of Beetles and Ants. Dr. W. Junk Publishers, The Hague.

Gapud, V.P. 1992. Insect and Mite Pests of Plant Crops in Bangladesh and their Natural Enemies. USAID/BARC/Checchi & Co. Publ.

Gibb, Timothy & Christian Oseto. 2006. Arthropod Collection and Identification: Laboratory and Field Techniques. Academic Press. 336 pp. ISBN-13: 978-0123695451

Hill, D.S. 1994. Agricultural Entomology. Intercept Ltd., London.

Hunt, J.H. and Nalepa, C.A. 1994. Nourishment and evolution in insect societies. Intercept Ltd., London.

Kim, E.E.C. and McPheron, B.A. 1993. Evolution of insect pests-Patterns and variation. Intercept Ltd., London.

James B. Whitfield & Alexander H. Purcell III. 2012. *Daly and Doyen's Introduction to Insect Biology and Diversity*. Oxford University Press. 736 pp. ISBN-13: 978-0-19-538067-5

McNutt, D.N. 1976. Insect Collecting in the Tropics. Centre for Overseas Pest Research, London.

Peterson, A. 1960 & 1962. Larvae of Insects. Part-I & II. Edwards Brothers, Michigan.

Syllabus for M.S. in Entomology

Course No. ENTOM. 519 : Storage Entomology

Credit hour: 2

1. Major Pests of Stored grains and Grain products: Bio-ecology and damage of important insect pests of stored grains, grain products and other foodstuff.
2. Infestation Detection Methods: Sources and objects of infestation, methods to detect visible and latent grain infestation, Detection of infestation of granaries, processing plants, equipment and other materials.
3. Management Tactics:
   Quarantine measures, prophylactic measures.
   Exterminatory measures- Biological control, botanical pesticides, radiation, fumigation and heat sterilization.
   Management of stored grain insects through modifying temperatures.
4. Rodent, bird and mite pests for stored products and their management.

Books Recommended:

Text Books

Cotton, R.T. 1963. Pests of stored grain and grain products. Burgess Publ. Co. Minn., USA.

Zakladnoi, G.A. and Ratanova, V.F. 1987. Stored-grain Pests and Their control. Oxonian Press Pvt. Ltd., New Delhi.

Reference Books

Alam, M.Z. 1971. Pest of stored grain and stored product and their control. Agril. Inform. Serv., Dhaka.

Brown, A.W.A. 1961. Insect control by chemicals. John Wiley, New York.

Cornwell, P.B. 1966. The Entomology of radiation dis-infestation of grains. Macmillan Co., New York.

Highley, E, Wright, E. J., Banks, H. J. and Champ, B. R. 1994. Stored product protection. Intercept Ltd, London.

Munro, J.W. 1966. Insect of stored products.

Pingale, S.N. 1984. Handling and storage of food grains. ICHR, India.

Subramanyam, B. and Hagstrum, D. W. 1996. Integrated management of insects in stored products. Marcel Dekker, NewYork.

Syllabus for M.S. in Entomology

Course No. ENTOM. 521 : Insecticide Toxicology

Credit hour: 2

1. Mode of Action and Metabolism of Insecticides: Toxicology, mechanism of action and metabolism of organophosphates, carbamates, organochlorine compounds, nicotionides, rotenoides and pyrethroides.
2. Factors of Insecticide Toxicity: Factors influencing the toxicity of insecticides in the insect body. Effect of foods in insect body to the tolerance levels of toxic materials.
3. Insecticide Resistance: Factors of insecticide rersistance. Organochlorine, organophosphate and carbamate resistance.

4. Synergism and Antagonism: Inductive and non-inductive effects, joint action of insecticides.
5. Insecticide Analytical Methods: Principles of insecticide analysis. Analytical techniques. Analysis of formulations- physical test and chemical analysis. Pesticide Residue analysis and its relationship to hazard characterization and intake estimation.

Books Recommended :

Text Books

Gunther, F.A. and Blin, R.C. 1988. Analysis of insecticides and dacaricides. Interscience Publ., New York.

Matsumura, F. 1980. Toxicology of insecticides. Plenum press, New York and London.

O-Brien, R.D. 1967. Insecticides Action and Metabolism. Academic Press, New York.

Ramulu, U.S. 1985. Methods of pesticides analysis. Oxford and IBH Publ. Co., New Delhi, Bombay and Calcutta.

Reference Books

Agarwal, R.A., Gupta, G.P., Kishore Prem and Chandra Dinesh. 1983. Principles and concepts of integrated pest management. ICAR, New Delhi-110012, India.

Brian D. McGarvey, Manual of Pesticide Residue Analysis Vol.1., Amazon.

Brown, A.W.A. 1961. Insect control by chemicals. John Wiley, New York.

Evans, J.W. 1987. Insect pest and their control. Soni Reprints Agency, Delhi.

Kilgore, W.W. and Doutt, R.L. 1967. Pest control, biological, physical and selected chemical methods. Academic Press, New York.

Metcalf, E.R. 1981. Management of insect pests with semiochemicals concept and practices. Academic Press, New York.

Otto, D. and Weber, B. 1992. Insecticides- Mechanism of action and resistance. Intercept Ltd, London.

Ramulu, U.S. 1979. Chemistry of insecticides and fungicides. Oxford and IBH Publ. Co., New Delhi, Bombay and Calcutta.

Rose, G.J. 1963. Crop protection. Leonara Hill (Hooks), London.

Shorey, H.H. and Mc. Kelvey, J.J.Jr. 1977. Chemical control of insect behaviour, Theory and application. John Wiley Interscience Publ., New York.

Syllabus for M.S. in Entomology

Course No. ENTOM. 523 : Industrial Entomology

Credit hour: 2

1. Sericulture: Economic importance, types of silkworm and their distribution, morphology of mulberry silkworm, description of digestive system, glands and reproductive system of silkworm, rearing techniques of mulberry silkworm, composition of silk, silkworm diseases and pests, techniques of race improvement.

   Moriculture - Varieties, cultivation and management practices, diseases and pest of mulberry
2. Apiculture: Economic importance of beekeeping, species of honey bee, morphology and anatomy of honey bee. bee pasturage, communication system of foraging bees, rearing techniques of honey bee, management of bee colony- bee diseases and enemies, robbing of bee colonies, laying workers and drone layers, swarming of bee colony, colony absconding, and colony collapse disorder, special management practices-dividing and uniting colonies, queen rearing, requeening, feeding method, moving colonies, and package bees, honey- extraction, refining and reservation, beewax-extraction procedure.
3. Lac culture: Economic importance and prospect of lac culture, genus, species and strains of lac insect, biology and rearing of lac insect, manufacturing of shellac, lac products and lac enemies.

Books Recommended:

Text Books

Krishnaswami, S. 1978. Sericulture manual 2. Silkworm rearing. Central Sericultural Research and Training Institute, Mysore, India.

Pruthi, H.S. 1969. A Text Book of Agricultural Entomology. Indian Council of Agricultural Research, New Delhi.

Singh, S. 1982. Beekeeping in India. Indian Council of Agricultural Research, New Delhi.

Reference Books

Cooper, E.K. 1964. Silkworms and Science. Butterworth Press, London.

Hossain, A. B. M. A. and Sharif, M. 1993. Moumachi Palanbidha. Bangla Academy, Dhaka.

Jean-Prost, P. and Medori, P. 1994. Apiculture. Intercept Ltd, London

Mace, H. 1976. The Complete hand book of Beekeeping. Ward Lock Limited, London.

Morie, Y. and Watanabe, M. 1980. Recent Advances in Sericulture. Ann. Rev. Entomol. 25 : 49-71.

Islam, B.N. 1981. Improvement of Silkworm Multiplication and Silk Production under Bangladesh condition. Dept. of Entomology, BAU, Mymensingh.

Krishnaswami, S. 1978. New Technology of Silkworm rearing. Bull. 2. Central Silk Board, Bombay, India.

Sarkar, D.C. 1980. Ericulture in India. Central Silk Board, Bombay, India.

Tazima, Y. 1957. Report on Sericulture Industry in India. Central Silk Board, Bombay, India.

Syllabus for M.S. in Entomology
Course No. ENTOM. 525: Insect Morphology
Credit hour: 2

1. Anatomical structures of insect: Insect head types and modification, modification of mouth parts and feeding behavior, structure, types and function of antennae, wing and legs.
2. Structural of cuticle and pigment.
3. Study of genetalia and ovipositior in insects
4. Structural modification: Special morphological adaptation of important orders and families of insects.
5. Evolutionary changes in insects: Morphological changes of Apterygota and pterygota evolved through geological time.

Books Recommended:

Text Books

Gullan, P. J. and Cranston, P. 2010. The Insects: An Outline of Entomology, 4th edition. Wiley-Blackwell Press.
Imm's, A. D. 1977. Imms' General Textbook of Entomology, 10th ed. rev. by O.W. Richards and R.G. Davies, 2 vol..
McGavin G. C. 2011. Essential Entomology. Oxford University Press. UK.
Snodgrass, R. E. 2001. Principles of Insect Morphology. CBS Publishers & Distributors, Delhi.
Triplehorn, C. A. and Johnson, N.F. 2005. Borror and DeLong's Introduction to the Study of Insects, 7th Edition. Thompson Brooks/Cole. Belmont, California.

Reference Books

Downer, R.G.H. 1987. Energy metabolism in insects. Plenum Publ. Crop., New York.
Lawrence, J. and Britton, E.B. 1994. Australian beetles. Intercept Ltd., London.
Ross, H.H. 1965. A Textbook of Entomology. John Wiley, New York.
Snodgrass, R.E. 1954. Insect metamorphosis. Smithsonian miscellaneous collections. Vol. 122, No. 9, Smithsonian Institution. Washington, D.C., U.S.A.
Zhang, Bin-Cheng. 1994. Index of economically important lepidoptera. Intercept Ltd., London.

Syllabus for M.S. in Entomology

Course No. STAT. 545: Experimental Design (Proposed)
Credit hour: 2

Preliminaries: Concept of experiment and experimental design, Analysis of variance. Basic experimental designs, Techniques of multiple comparison, usual tests for multiple comparisons. Estimation and analysis of missing value in randomized block design and Latin square design.

Factorial Experiments: Concepts of main effects and interactions. Selection, layout and analysis of variance in factorial experiments conducted in completely randomized design and randomized block design (Symmetric and asymmetric design). Split-plot and Split-split-plot, confounding (total and partial) and incomplete block designs.

Incomplete Block Design: Concept of incomplete block design and balanced incomplete block design, construction of balanced incomplete block designs, analysis of BIB design, lattice design, partially balanced incomplete block design, incomplete block designs as weighing designs.

Analysis of Covariance: Definition, models and estimation of parameters. Analysis of covariance in completely randomized design and randomized block design.

Data Transformation: Square-root transforma-tion, logarithmic transformation and angular transformation, The Box-Cox method.

Books Recommended:

Texts Books

1. Montgomery, D.C. (2003): Design and Analysis of Experiments, 5th ed, Wiley, N.Y.
2. Ahmed A.R., M.A.A. Bhuiyan, and M. Z. Hossain (2003): Experimental Designs: Theory and Application. Rokeya Sultana Mili, Dhaka.
3. Meed, R., R.N. Cornow and A. M. Hasted (1993): Statistical Methods in Agriculculture and Experimental Biology. Chapman and Hall.

References Books

Gomez, K.A. and A.A. Gomez (1984): Statistical Proceedings for Agricultural Research. John Wiley & Sons.

1. Federer, M. T. (1977): Experimental Design. Indian ed. Oxford & IBH Publishing Co., NY.
2. John, P.W.M. (1971): Statistical Analysis of Experimental Design. Collier McMilan, NY.
3. Kempthorne, O. (1952): Design and Analysis of Experiments. Wiley and Sons, NY.
4. Scheffe, H. (1961): Analysis of variance. Wiley and Sons, NY.
5. Mead, R. (1988): The Design of Experiments: Statistical Principles for Practical Applications. Cambridge University Press.
6. Das,M.N. and Giri,N.C.(1998): Design and Analysis of Experiments.2nd ed. New Delhi: Wily Eastern.

***** To be offered by the Department of Agricultural Statistics, Faculty of Agricultural Economics and Rural Sociology, Bangladesh Agricultural University, Mymensingh.

Syllabus for M.S. in Entomology

Course No. ENTOM. 527: Chemical Ecology

1. Concept and areas of chemical ecology
2. Secondary metabolites: Types, biosynthesis and degradation of important secondary metabolites in plants, factors influencing the accumulation of secondary metabolites in plants, Role of secondary metabolites in plant resistance, Isolation, characterization and formulation of active compounds from plants, In vitro production of secondary metabolites.
3. Plant-Insect Interaction: Chemicals involved in the mediation of interaction, plant volatiles and their roles in host findings, ques and oviposition of insects, Interaction of plant volatiles to pest insects and their higher trophic level (predator and parasites), factors influencing volatile release of plants, detoxification and sequestration mechanism of different secondary metabolites by the insects.
4. Tritrophic interaction: mechanism of plant-insect-insect interactions, insect-plant-pathogens interactions, factors influencing tritrophic interactions.
5. Semiochemicals: concept and types of semiochemicals, Isolation, identification, characterization and synthesis of different semiochemicals.

Books recommended

1. Raphael Ikan (Editor). 199. Naturally Occurring Glycosides, 1st edition. John Wiley & Sons, 460p.
2. H. G. Andrewartha and L. C. Birch. 1970. The Distribution and Abundance of Animals. University of Chicago Press, 782p.
3. Dent, David. 2000. Insect pest management. 2nd edition. CABI Publishing, 424p.
4. Jun Tabata. 2018. Chemical Ecology of Insects: Applications and Associations with Plants and Microbes. CRC Press, 296p.
5. Ring T. Cardé and Jocelyn G. Millar. Advances in Insect Chemical Ecology. 2009. Cambridge University Press.
6. Eric Wajnberg and Stefano Colazza (Editor). 2013. Chemical ecology of insect parasitoids. John Wiley & Sons, Ltd.
7. Roitberg, B.D., and Isman, M.B. (eds.) 1992. Insect Chemical Ecology. An Evolutionary Approach. Chapman & Hall, New York, 359 pp.
8. Harborne, J.B. 1993. Introduction to Ecological Biochemistry. Fourth Edition. Academic Press, London & San Diego, 318 pp.
9. Cardé, R.T., and W.J. Bell. (eds.) 1995. Chemical Ecology of Insects 2. Chapman & Hall, New York, 433 pp.
10. Eisner, T., and J. Meinwald (eds.) 1995. Chemical Ecology: The chemistry of biotic interaction. National Academy Press, Washington, 214 pp.
11. Halkier BA, Gershenzon J. 2006. Biology and biochemistry of glucosinolates. Annu. Rev.Plant Biol.57:303–33.

Syllabus for M.S. in Entomology

Course No. ENTOM. 529: Insect Biotechnology

1. **Genes and genome organization in insect**: Genome, DNA, Gene structure and DNA replication, Transcription, Translation and Regulation of insect DNA, Nuclear and extra-nuclear DNA in insect.
2. **Molecular techniques in insect research:** Gene cloning, PCR**,** Electrophoresis and gel documentation, Site-directed mutagenesis, DNA barcoding, Protein profiling.
3. **Transgenic insect resistant plants**: Concept, potential transgenes and vectors, Genetic transformation methodologies. Screening technique for plant resistance to insect. Transgenic insect resistant plant and pest management.
4. **Transgenic insects and entomopathogens**: Importance and prospect of transgenic insects and entomopathogens in Bangladesh. Methods to deliver foreign genes and vectors into insect tissues. Screening techniques for identification of transformed insects. Transgenic insects in agriculture and industry. Genetic improvement of entomopathogens.
5. **Biotechnology in insect management:** Applications of molecular tools such as RNAi, transgenic plants, recombinant protease inhibitor, insect antimicrobial peptides, and others for insect management. Potentials and risks of biotechnology in IPM

References:

1. Carozzi, N. and Koziel, M. 1997. Advances in insect control. The role of transgenic plants. Taylor and Francis, UK and USA.
2. Clements, S.L. and Quisenberry, S.S. 1998. Global plant genetic resources for insect resistant crops. CRC Press, Boca Raton, Florida.
3. Dodds, J.H. and Roberts, L.W. 1988. Experiments in plant tissue culture. Second edition, Cambridge University Press, Cambridge, New york, New Rochelle, Melbourne, Sydney.
4. Hoy, M.A. 2003. Insect molecular genetics. An introduction to principles and applications. Academic Press, New York.
5. Panda, N. and Khush, G.S. 1995. Host plant resistance to insects. CAB International, UK.
6. Puruhit, S.S. and Mathur, S.K. 1996. Biotechnology. Agro's Botanical Publishers, India.
7. Setlaw, J.K. 1988. Genetic engineering- Principles and methods. Plenum Press, New York and London.
8. Desmond S. T. Nicholl. 2008. An Introduction to Genetic Engineering. 3rd Edition. Cambridge University Press.
9. Smith, C.M., Khan, Z.R. and Pathak, M.D. 1994. Techniques for evaluating insect resistance in crop plants. Lewis Publisher, Boca Raton, Florida.
10. Tanada, Y. and Kaya, H.K. 1993. Insect pathology. Academic Press, San Diego, New York, Boston, London, Sydney, Tokyo, Toronto.

Syllabus for M.S. in Entomology

Course No. ENTOM. 531: Acarology

1. **Anatomy, phylogeny and systematics**- External and internal anatomy of Tetranychidae, phylogenetic relationship and systematics of spider mites.
2. **Evolutionary changes in the Tetranychidae**- Variation in the outline of dorsal setae, shape of the peritremes, shape of the aedeagus,
3. **Population dynamics of spider mites**- Biotic and abiotic factors involving the population dynamics of spider mites.
4. **Reproductive strategies**- Introduction, intrinsic rate of natural increase, life history evolution, host plant selection, host plant change and reproductive barriers.
5. **Economic acarology** - Status of agriculturally important spider mites, their nature of damage and integrated mite management.

Books recommended

Text books

1. Bolland, H. R., J. Gutierrez and C. H. W. Flechtman. 1998. World Catalogue of the Spider Mite Family (Acari: Tetranychidae). Brill Academic Publisher, Leiden. 392 pp.
2. Ehara S, Gotoh T (eds) (2009) Colored guide to the plant mites of Japan. Zenkoku-Noson-Kyoiku-Kyokai, Tokyo, 349 pp.
3. Helle, W. and Sabelis, M.W. (eds). 1985. Spider mites. Their biology, natural enemies and control. World Crop Pests, Volume 1B. Natural enemies of the Tetranychidae. Amsterdam etc., Elsevier, 458 pp.
4. Jan Bruin and M. W. Sabelis. 2010. Trends in acarology: proceedings of the 12th international congress. Springer. 670 pp.
5. Jeppson LF, Keifer HH and Baker EW. 1975. Mites injurious to economic plants. University of California Press, USA, 614 pp.
6. Krantz, G. W. and Walter, D. E. 2009. A manual of Acarology. (3rd edition) Texas Tech University Press. USA.
7. Viraktamath, C. A. and Channabasavanna, G. P. (eds) 1989. International Congress of Acarology: Progress in acarology / editors, G.P. Channabasavanna, C.A. Viraktamath Brill, Leiden.
8. Zhang, Z.-Q. 2003. Mites of greenhouses. Identification, biology and control. Wallingford, CABI Publishing. 244pp.

Reference book

1. Chant, D.A. and McMurtry, J.A. 2007. Illustrated keys and diagnoses for the genera and subgenera of the Phytoseiidae of the world. Indira Publishing House, 220 pp.
2. Gerson, U., Smiley, R.L. and Ochoa, R. 2003. Mites (Acari) for Pest Control. Blackwell Science, Oxford. 539 pp.
3. Hoy, M.A. 2011. Agricultural Acarology: Introduction to Integrated Mite Management. CRC Press Inc., 430 pp.
4. Saito, Y. 2010. Plant Mites and Sociality. Diversity and Evolution. Springer, 191 pp.
5. Walter, D. E. and Proctor, H. 1999. Mites: Ecology, Evolution and Behaviour. Sydney, University of New South Wales Press and Wallingford, CABI Publishing. 322 pp.