

8. References

- Abdel-Aal, Y.A.I., Wolff, M.A., Roe, R.M. and Lampert, E.P. 1990. Aphid carboxylesterases: biochemical aspects and importance in the diagnosis of insecticide resistance. *Pestic. Biochem. Physiol.* **38**: 255-266.
- Abdel-Aal, Y.A.I., Lampert, E.P., Roe, R.M. and Semtner, P.J. 1992. Diagnostic esterases and insecticide resistance in the tobacco aphid, *Myzus nicotianae* Blackman (Homoptera: Aphididae). *Pestic. Biochem. Physiol.* **43**: 123-133.
- Abdel-Aal, Y.A.I., Ibrahim, S.A., Lampert, E.P. and Rock, G.C. 1993. Detection methodology of esterase-mediated insecticide resistance: from bioassay to biotechnology. In: *Reviews in pesticide toxicology* Vol. 2. (Eds) Roe, R.M. and Kuhr, R.J.; Toxicology communications, Raleigh, NC., pp. 13-33.
- Agusti, N. and Cohen, A.C. 2000. *Lygus hesperus* and *L. lineolaris* (Hemiptera, Miridae), phytophages, zoophages, or omnivores: evidence of feeding adaptations suggested by the salivary and midgut digestive enzymes. *J. Entomol. Sci.* **35**: 176-186.
- Ahmad, S., Brattsten, L. B., Mullin, C. A. and Yu, S. J. 1986. Enzymes involved in the metabolism of plant allelochemicals. In: *Molecular Aspects of Insect- Plant Associations*. (Eds) Brattsten, L. B. and Ahmad, S. ; Plenum Press, New York, pp. 73-151.
- Ahmad, Z., Saleemuddin, M. and Siddiqi, M. 1980. Purification and characterization of three alkaline proteases from the gut of the larva of army worm, *Spodoptera litura*. *Insect Biochem.* **10**: 667-673.
- Ahmed, M. 1996. Relationship between infestation intensity and crop loss by *Helopeltis* in tea. *Tea J. Bangladesh.* **32**(1&2): 20-30.
- Aldridge, W.N. and Reiner, E. 1972. Enzyme inhibitors as substrates. In: *Frontiers of Biology*. (Eds) Neuberger, A. and Tatum, E.I.; Vol 26, North Holland, Amsterdam, pp. 1-328.

- Andrews, E.A. 1928. Red spider. *Quart. J. Indian Tea Ass.* **3 & 4**: 206-219.
- Anonymous. 1994. *Pests of tea in North-East India and their control*. Memorandum 27. Tea Research Association. Tocklai Experimental Station, Jorhat, Assam, India. pp. 29-38.
- Anonymous. 2003. *A search for the arthropod enemies of tea pests from Darjeeling slopes and adjoining plains with a study on their efficacy*. Annual Scientific Report, 2002–2003, National Tea Research Foundation, Tea Board, Kolkata, pp.16-33.
- Anspaugh, D.D., Rose, R.L., Koehler, P.G., Hodgson, E. and Roe, R.M. 1994. Multiple mechanisms of pyrethroid resistance in the German cockroach, *Blattella germanica* (L.). *Pestic. Biochem. Physiol.* **50**: 138-148.
- Antram, C. B. 1911. The looper caterpillar pest of tea. *Quart. J. Indian Tea Ass.* **1**: 7.
- Anwar, A. and Saleemuddin, M. 1997. Alkaline-pH-acting digestive enzymes of the polyphagous insect pest *Spilosoma obliqua*: stability and potential as detergent additives. *Biotechnol. Appl. Biochem.* **25**: 43–46.
- Appel, H.M. 1993. The chewing herbivore gut lumen: physiochemical conditions and their impact on plant nutrients, allelochemicals and insect pathogens. In: *Insect-plant Interactions* Vol.5. (Ed) Bernays, E.A.; CRC Press, Boca Raton, Florida, pp. 209-223.
- Appel, H.M. and Maines, L.W. 1995. The influence of host plant on gut conditions of Gypsy moth (*Lymantria dispar*) caterpillars. *J. Insect Physiol.* **41**(3): 241-246.
- Applebaum, S.W. 1985. Biochemistry of digestion. In: *Comparative Insect Physiology, Biochemistry and Pharmacology* Vol.4. (Ed) Kerkut, G.A. and Gilbert, L.I.; Pergamon Press, Toronto, pp. 279-312.
- Armstrong, K.F. and Suckling, D.M. 1988. Investigations into the biochemical basis of azinphosmethyl resistance in the light brown apple moth, *Epiphyas postvittana* (Lepidoptera: Tortricidae). *Pestic. Biochem. Physiol.* **32**: 62-73.

- Armstrong, K.F. and Suckling, D.M. 1990. Correlation of azinphosmethyl resistance with detoxication enzyme of activity in the light brown apple moth *Epiphyas postvittana* (Lepidoptera: Tortricidae). *Pestic. Biochem. Physiol.* **36**: 281-289.
- Aswathy, R.C. and Venkatakrisnan, N.S. 1977. Benefit evaluation of Tocklai Recommendations III. Control of red spiders. *Two and a Bud.* **24**(2): 37-38.
- Atkinson, T. H., Wadleigh, R. A., Koehler, P. G. and Patterson, R. S. 1991. Pyrethroid resistance and synergism in a field strain of the German cockroach (Dictyoptera: Blattellidae). *J. Econ. Entomol.* **84**: 1247-1250.
- Atwal, A.S. 1986. Future of pesticides in plant protection. *Proc. Indian Nat. Sci. Acad.* **52** (1): 77-90.
- Aucoin, R.R., Philogene, B.J.R. and Arnason, J.J. 1991. Antioxidant enzymes as biochemical defenses against phototoxin-induced oxidative stress in three species of herbivorous Lepidoptera. *Arch. Insect Biochem. Physiol.* **16**: 139-152.
- Ayala, F.J. 1983. Enzymes as taxonomic characters. In: *Protein polymorphism: adaptive and taxonomic significance*. (Eds) Oxford G.S. and Rollinson, D.; Academic Press, London and New York, pp. 3-26.
- Baker, J.P. 1979. Electrophoretic studies on populations of *Myzus persicae* in Scotland from October to December, 1976. *Ann. Appl. Biol.* **91**: 159-164.
- Baldwin, E. 1967. *Dynamic Aspects of Biochemistry*. Cambridge Univ. Press, Cambridge, UK.
- Ballard, B. 1921. *Helopeltis* and its relatives. *Planters' Chron.* **16**: 489-491.
- Bandani, A.R., Amiri, B., Butt, T.M. and Gordon-Weeks, R. 2001. Effects of efrapeptin and destruxin, meabolites of entomogenous fungi, on the hydrolytic activity of a vacuolar type ATPase identified on the brush border membrane vesicles of *Galleria mellonella* midgut and on plant membrane bound hydrolytic enzymes. *Biochem. Biophys. Acta.* **1510**: 367-377.
- Banerjee, B. 1965. Mites of tea and ancillary crops. *Two and a Bud.* **12**: 4-7.

- Banerjee, B. 1967. The need for conserving natural enemies of pests. *Two and a Bud.* **14**(3): 133-136.
- Banerjee, B. 1968. Insect resistance. *Two and a Bud.* **16**(1): 13-14.
- Banerjee, B. 1971. The economics of prophylactic spraying. pp. 145-150. In: *Proceedings of the 25th Tocklai Conference*, Tocklai Experimental Station, Jorhat.
- Banerjee, B. 1975. Consideration in integrated control for mite pests of tea. pp. 13-15. In: *Proceedings of the 27th Tocklai Conference*, Tocklai Experimental Station, Jorhat.
- Banerjee, B. 1976. Pesticide and pesticide residue in tea. *Two and a Bud.* **23**(2): 35-42.
- Banerjee, B. 1977. Problems of pest control. pp. 56-60. In: *Proceedings of the 28th Tocklai Conference*, Tocklai Experimental Station, Jorhat.
- Banerjee, B. 1979. The mating speed in *Oligonychus gossypii* (Zacher) (Tetranychidae: Acarina). *International Journal of Invertebrate Reproduction.* **1**: 201-204.
- Banerjee, B. 1980. Intratree variation in the distribution of the tea red spider mite *Oligonychus coffeae* (Nietner). *Acarologia.* **21**: 216-220.
- Banerjee, B. 1983a. Arthropod accumulation on tea in young and old habitats. *Ecol. Entomol.* **8**: 117-123.
- Banerjee, B. 1983b. Pests of tea. In: *Agricultural Entomology* Vol. 2. (Eds) Srivastava, P. D., Jotwani, M. G., Agrawal, R. A., Wadhi, S. R., Bhanotar B. K. and Bhatnagar, R. K.; All India Scientific Writers Society, New Delhi, pp. 261-272.
- Banerjee, B. 1988. *An Introduction to Agricultural Acarology.* Associated Publishing Co. New Delhi.
- Banerjee, B. 1993. *Tea Production and Processing.* Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
- Banerjee, B. and Cranham, J.E. 1985. Tea. In: *Spider mites: their biology, natural enemies and control.* Vol. 2B. (Ed) Helle, W. and Sanilis, M.W.; Elsevier Science Publication, Amsterdam, pp. 371-374.
- Baptist, B.A. 1941. The morphology and physiology of salivary glands of the Hemiptera-Heteroptera. *Q.J. Microsc. Sci.* **83**: 91-139.

- Barbehenn, R.V. 2002. Gut-based antioxidant enzymes in a polyphagous and a gaminivorous grasshopper. *J. Chem. Ecol.* **28**(7): 1329-1347.
- Barbehenn, R.V. and Martin, M.M. 1994. Tannin sensitivity in *Malacosoma disstria*: Roles of the peritrophic envelope and midgut oxidation. *J. Chem. Ecol.* **20**: 1985-2001.
- Barbehenn, R.V., Martin, M. M. and Hagerman, A.E. 1996. Reassessment of the roles of the peritrophic envelope and hydrolysis in protecting polyphagous grasshoppers from ingested hydrolysable tannins. *J. Chem. Ecol.* **22**: 1901-1919.
- Barbora, B.C. and Biswas, A.K. 1996. Use pattern of pesticides in Tea Estates of N.E. India. *Two and a Bud.* **43**(2): 4-14.
- Barbora, B.C., Chakravartee, J., Singh, K., Kakoty, N.N. and Borthakur, B.K. 1994. Integrated pest and disease management in tea. Special bulletin, Tea Research Association, Tocklai Experimental Station, Jorhat, Assam.
- Baumann, L. and Baumann, P. 1995. Soluble salivary proteins secreted by *Schizaphis graminum*. *Entomol. Exp. Appl.* **77**: 57-60.
- Beeman, R. W. and Schmidt, B. A. 1982. Biochemical and genetic aspects of malathion-specific resistance in the Indian meal moth (Lepidoptera: Pyralidae). *J. Econ. Entomol.* **75**: 945-949.
- Beeson, C. F. C. 1941. The Ecology and Control of the Forest Insects of India and the Neighbouring Countries, Dehra-Dun, 1007 p.
- Berenbaum, M.R. 1980. Adaptive significance of midgut pH in larval Lepidoptera. *Am. Nat.* **115**: 138-146.
- Bernays, E.A. and Chapman, R.F. 1994. *Host plant selection by phytophagous insects*. Chapman & Hall, London.
- Bjerrum, O.J. 1975. Quantitative immunoelectrophoresis. In: *Scandinavian J. Immunology*. Supplement 2.N.H. (Ed) Aas and Wahl; Axelsen, Oslo, Norway.
- Borthakur, B. 1975. Looper caterpillar. *Two and a Bud.* **22**(2): 91.

- Bowman, C.E. 1984. Comparative enzymology of economically important astigmatid mites. In: *Acarology* 6. Vol. 2. (Eds) Griffiths, D.A. and Bowman, C.E.; Ellis Horwood, Chichester, New York, pp. 993-1001.
- Bowman, C.E. and Childs, M. 1982. Polysaccharides in astigmatid mites (Arthropoda: Acari). *Comp. Biochem. Physiol.* **72**: 551-557.
- Branton, D. 1969. Membrane structure. *Annu. Rev. Plant Physiol.* **20**: 209-238.
- Brattsten, L. B. 1979. Biochemical defense mechanisms in herbivores against plant allelochemicals. In: *Herbivores: Their Interaction with Secondary Plant Metabolites*. (Eds) Rosenthal, G. A. and Janzen, D.; Academic Press, New York, pp.199-270.
- Brattsten, L. B. 1992. Potential role of plant allelochemicals in development of insecticide resistance. In: *Molecular mechanism of insecticide resistance, diversity among insects*. (Eds) Mullin, C. A. and Scott, J. G.; American Chemical Society, Symposium Series, Washington DC, pp. 313-348.
- Brent, K.J. 1986. Detection and monitoring of resistant forms: An overview. In: *Pesticide Resistance: Strategies and Tactics for Management*. (Eds) National Research Council, National Academic Press, Washington, D.C.
- Broadway, R.M. 1989. Characterization and ecological implications of midgut proteolytic activity in larval *Pieris rapae* and *Trichoplusia ni*. *J. Chem. Ecol.* **15**: 2101-2113.
- Bronskill, J.F., Salked, F.H. and Friend, W.G. 1958. Anatomy, Histology and Secretions of salivary gland of the large milkweed bug, *Oncopeltus fasciatus* (Dallas) (Hemiptera, Lygaeidae). *Can. J. Zool.* **36**: 961-968.
- Brown, T.M. and Brogdon, W.G. 1987. Improved detection of insecticide resistance through conventional and molecular techniques. *Annu. Rev. Entomol.* **32**: 145-162.

- Brown, T.M. and Bryson, P.K. 1992. Selective inhibitors of methyl parathion-resistant acetylcholinesterase from *Heliothis virescens*. *Pestic. Biochem. Physiol.* **44**(2): 155-164.
- Bull, D. and Whiten, L. 1972. Factors influencing organophosphorus insecticide resistance in tobacco bud worms. *J. Econ. Entomol.* **63**: 1492-1495.
- Byrne, F.J., Cahill, I. D. and Devonshire, A.L. 1994. A biochemical and toxicological study of the role of insensitive acetylcholinesterase in organophosphorus resistant *Bemisia tabaci* (Homoptera: Aleyrodidae) from Israel. *Bull. Ent. Res.* **84**: 179-184.
- Callaghan, A., Boiroux, V., Raymond, M. and Pasteur, N. 1994. Prevention of changes in the electrophoretic mobility of overproduced esterases from organophosphate-resistant mosquitoes of *Culex pipiens* complex. *Med. Vet. Entomol.* **8**: 391-394.
- Capua, S., Cohen, E. and Gerson, U. 1990. Non-specific esterase in mites- a comparative study. *Comp. Pharm. Toxicol.* **96**: 125-130.
- Chakravartee, J. 1995. Tea Pest Management: Present Status and Research Needs. *Two and a Bud.* **43**(1): 23-32.
- Chen, X. and Kunshan, Y. 1988. Pest Fauna of Tea Plant in China and its Integrated Management. pp. 154-159. In: *Proceedings of International Tea-Quality-Human Health Symposium*, China.
- Chen, Z. and Chen, X. 1989. An analysis of world tea pest fauna. *J. Tea Sc.* **9**: 13-22.
- Chien, C., Motoyama, N. and Dauterman, W. C. 1995. Separation of multiple forms of acidic glutathione S-transferase isozymes in a susceptible and a resistant strain of house fly, *Musca domestica* (L.). *Arch. Insect Biochem. Physiol.* **28**(4): 397-406.
- Christeller, J.T., Liang, W.A., Markwick, N.P. and Burgess, E.P.J. 1992. Midgut protease activities in 12 phytophagous lepidopteran larvae: dietary and proteases inhibitor interactions. *Insect Biochem. Molec. Biol.* **22**: 735-746.

- Clark, A. G. and Shamaan, N. A. 1984. Evidence that DDT-dehydrochlorinase from the house fly is a glutathione S-transferase. *Pestic. Biochem. Physiol.* **22** (3): 249-261.
- Clark, A.G. and Dauterman, W.C. 1982. The characterization by affinity chromatography of glutathione S-transferases from different strains of house fly. *Pestic. Biochem. Physiol.* **17**: 307.
- Clark, A.G., Shamaan, N.A., Sinclair, M.D. and Dauterman, W.C. 1986. Insecticide metabolism by multiple glutathione S-transferases in two strains of the house fly, *Musca domestica* (L.). *Pestic. Biochem. Physiol.* **25**: 169-175.
- Cohen, A.C. 1990. Feeding adaptations of some predaceous heteropterans. *Ann. Entomol. Soc. Am.* **83**: 1215-1223.
- Cohen, A.C. 1993. Organization of digestion and preliminary characterization of salivary trypsin-like enzymes in a predaceous heteropteran, *Zelus renardii*. *J. Insect Physiol.* **39**: 823-829.
- Cohen, A.C. 1995. Extra-oral digestion in predatory Arthropoda. *Annu. Rev. Entomol.* **40**: 85-103.
- Cohen, A.C. 1996. Plant feeding by predatory Heteroptera: evolutionary and adaptational aspects of trophic switching. In: *Zoophytophagous Heteroptera: implications for life history and integrated pest management*. (Eds) Alomar, O. and Wiedenmann, R.N.; Entomological Society of America, Lanham, MD, pp. 1-17.
- Cohen, A.C. 1998. Solid-to-liquid feeding: the inside(s) story on extra-oral digestion in predaceous Arthropoda. *Am. Entomol.* **44**: 103-117.
- Cohen, A.C. 2000. How carnivorous bugs feed. In: *Heteroptera of economic importance*. (Eds) Schaefer, C.W. and Panizzi, A.R.; CRC Press, Boca Raton, FL, pp. 563-570.

- Colebatch, G.M., East, P. and Cooper, P. 2001. Preliminary characterization of digestive proteases of the green mirid, *Crotoniades dilutus* (Hemiptera: Miridae). *Insect Biochem. Molec. Biol.* **31**: 415-423.
- Cotes, E.C. 1895. An account of insects and mites which attack the tea plant in India. Revenue and Agricultural Department, Calcutta. 71 p.
- Cramer, H.H. 1967. Plant protection and World Crop Production, Bayer, Leverkusen.
- Cranham, J. E. 1966. Tea pests and their control. *Annu. Rev. Entomol.* **11**: 491-514.
- Cuany, A., Handani, J., Berge, J., Fournier, D., Raymond, M., Georghiou, G.P. and Pasteur, N. 1993. Action of esterase B1 on chlorpyrifos in organophosphate-resistant *Culex* mosquitoes. *Pestic. Biochem. Physiol.* **45**:1-6.
- Danthanarayana, W. and Kathiravetpillai, A. 1969. Studies on the ecology and causes of outbreaks of *Ectropis bhurmitra* Wkr. (Geometridae), the twig caterpillar of tea in Ceylon. *J. Appl. Ecol.* **6**: 311 – 322.
- Danthanarayana, W. and Ranaweera, D.J.W. 1970. The red spider mite and scarlet mite of tea and their control. *Tea Quart.* **41**: 19-33.
- Dary, O., Georghiou, E., Parsons, E. and Pasteur, N. 1990. Microplate adaptation of Gomori's assay for quantitative determination of general esterase activity in single insects. *J. Econ. Entomol.* **83**: 2187-2192.
- Das, G.M. 1959. Bionomics of the red spider mite, *Oligonychus coffeae* (Nietner). *Bull. Ent. Res.* **50**: 265-275.
- Das, G.M. 1962. Problems of pesticide residue in tea. *Two and a Bud.* **9**(1): 17-18.
- Das, G.M. 1965. *Pests of tea in North-East India and their control*. Tocklai Experimental Station, Cinnamara, Assam. 115 p.
- Das, S. C. and Gope, B. 1987. Towards better control of looper. *Two and a Bud.* **34**(1 & 2):10-16.
- Das, S. C., Borthakur, M. C. and Gope, B. 1988. Need for non-conventional approach in tea pest management. pp. 80 – 89. In: *Proceedings of 30th Tocklai Conference*. Tocklai, Jorhat.

- Das, S.C. 1953. Some basic points in mite control of tea. *Two and a Bud.* 30(1 & 2): 2-28.
- Das, S.C. 1984. Resurgence of tea mosquito bug, *Helopeltis theivora* Waterh. a serious pest of tea. *Two and a Bud.* 31(2): 36-39.
- Dauterman, W. C. 1985. Insect metabolism: extramicrosomal. In: *Comprehensive Insect Physiology, Biochemistry and Pharmacology*. (Eds) Kerkut, G. A. and Gilbert, L. I. Pergamon Press, Oxford, pp. 713-730.
- Davis, B. J. 1964. Disc electrophoresis II Method and application to human serum protein. *Ann. B. T. Acad. Sci.* 121: 404-427.
- de Malkelson, N.C., Wood, E.J. and Zebra, E.N. 1984. Isolation and characterization of an esterase of *Tritoma infestans* with a critical role in the degradation of organophosphorous esters. *Insect Biochem.* 14: 48-486.
- DeBach, P. 1974. *Biological control by natural enemies*. Cambridge University Press, Cambridge, 71-72 pp.
- Deimann, W., Angermuller, S., Stoward, P.J. and Fahimi, H.D. 1991. Peroxidases. In: *Histochemistry Theoretical and Applied* Vol. 3. (Eds) Stoward, J.P. and Pearse, A.G.E.; Churchill Livingstone, Edinburgh, pp. 135-139.
- Delorme, R., Fournier, D., Chaufaux, J., Cuany, A., Bride, J.M., Auge, D. and Berge, J.B. 1988. Esterase metabolism and reduced penetration are causes of resistance to deltamethrin in *Spodoptera exigua* HUB (Noctuidea; Lepidoptera). *Pestic. Biochem. Physiol.* 32: 240-246.
- Dennehy, T. J. and Granett, J. 1984. Monitoring dicofol-resistant spider mites (Acari: Tetranychidae) in California cotton. *J. Econ. Entomol.* 77:1386-1392.
- Devonshire, A. L. and Field, L. M. 1991. Gene amplification and insecticide resistance. *Annu. Rev. Entomol.* 36: 1-23.

- Devonshire, A. L. and Field, L. M. 1995. Esterases in resistant peach-potato aphids, *Myzus persicae* (Sulzer). pp.192. In: *Towards the genetic manipulation of insects. Keystone Symposium on Molecular Cellular Biology*, Tammarron, Colorado, USA.
- Devonshire, A.L. 1975a. Studies of the carboxylesterases of *Myzus persicae* resistant and susceptible to organophosphorus insecticides. pp. 67-73. In: *Proceedings 8th British Insecticide and Fungicide Conference*. 1/1th to 20th November 1975, Hotel Metropole, Brighton, England.
- Devonshire, A.L.1975b. Studies of the acetylcholinesterase from houseflies (*Musca domestica* L.) resistant and susceptible to organophosphorus insecticides. *Biochem. J.* **149**: 463-469.
- Devonshire, A.L. 1977. The properties of a carboxylesteras from the peach-potato aphid, *Myzus persicae* (Sulzer) and its role in conferring insecticide resistance. *Biochem. J.* **167**: 675-683.
- Devonshire, A.L. and Moores, G.D. 1982. A carboxylesterase with broad substrate specificity causes organophosphorus, carbamate and pyrethroid resistance in peach-potato aphids (*Myzus persicae*). *Pestic. Biochem. Physiol.* **18**: 235-246.
- Devonshire, A.L. and Moores, G.D. 1984. Different forms of insensitive acetylcholinesterase in insecticide-resistant house-flies (*Musca domestica*). *Pestlc. Biochem. Physiol.* **21**: 336-340.
- Doichuanngam, K. and Thornhill, R.A. 1989. The role of non-specific esterase insecticide resistance to malathion in the diamond-back moth, *Plutella xylostella* L. *Comp. Biochem. Physiol.* **93**: 81-86.
- Doichuanngam, K. and Thornhill, R.A. 1992. Penetration, excretion and metabolism of ¹⁴C-malathion in susceptible and resistant strains of *Plutella xylostella*. *Comp. Biochem. Physiol.* **101**: 583-588.

- Dow, J.A.T. 1984. Extremely high pH in biological systems: a model for carbonate transport. *Am. J. Physiol.* **246**: 633-635.
- Dow, J.A. T. 1986. Insect mid gut function. *Adv. Insect Physiol.* **19**: 187-328.
- Duffey, S.S. and Stout M.J. 1996. Antinutritive and toxic components of plant defense against insects. *Arch. Insect Biochem. Physiol.* **32**: 3-37.
- Dyte, C. E. and Rowlands, D. G. 1968. The metabolism and synergism of malathion in resistant and susceptible strains of *Tribollum castaneum* (Herbst) (Coleoptera). *J. Stored. Prod. Res.* **4**: 157-173.
- Easteal, S. and Boussy, I.A. 1987. A sensitive and efficient isozyme technique for small arthropods and other invertebrates. *Bull. Ent. Res.* **77**: 407-415.
- Ellman, G.L., Courteny, D.K., Andres, V. Jr. and Featherstone, M.R. 1961. A new and rapid colorimetric determination of acetylcholinesterase activity. *Biochem. Pharmacol.* **7**: 88-95.
- Eto, M.1974.Organophosphorus pesticides organic and biological chemistry. CRC, Cleveland, OH.
- Evans G.O. 1992. *Principles of Acarology*. CAB International, Oxon, UK.
- Feir, D. and Beck, S.D.1961. Salivary secretions of *Oncopeltus fasciatus* (Hemiptera, Lygaeidae)- scientific note. *Ann. Entomol. Soc. Am.* **54**: 316.
- Felton, G.W. and Duffey, S.S. 1991. Protective action of midgut catalase in lepidoptean larvae against oxidative plant defenses. *J. Chem. Ecol.* **17**(9): 1715-1732.
- Felton, G.W. and Eichenseer, H. 1999. Herbivore saliva and its effects on plant defense against herbivores and pathogens. In: *Induced plant defenses against pathogens and herbivores*. (Eds) Agrawal, A.A. et al.; APS Press, St. Paul, MN, pp. 19-36.

- Ferrari, J.A., Morge, J.G., Georghiou, G.P. and Sun, Y. 1993. Elevated esterase activity and acetylcholinesterase insensitivity in citrus thrip (Thysanoptera: Thripidae) population from San Joaquin Valley of California. *J. Econ. Entomol.* **86**: 1645-1650.
- Field, L.M., Devonshire, A.L. and Forde, B.G. 1988. Molecular evidence that insecticide resistance in peach potato aphids (*Myzus persicae* Sulz.) results from amplification of an esterase gene. *Biochem. J.* **251**: 309-312.
- Field, L.M., Javed, N., Stribley, M.F. and Devonshire, A.L. 1994. The peach-potato aphid *Myzus persicae* and tobacco aphid *Myzus nicotianae* have the same esterase-based mechanisms of insecticide resistance. *Insect Mol. Biol.* **3**: 143-148.
- Field, L.M. and Devonshire, A.L. 1998. Evidence that the E4 and FE4 esterase responsible for insecticide resistance in the aphid *Myzus persicae* (Sulzer) are part of a gene family. *Biochem. J.* **330**(1): 169-173.
- Field, L.M., Blackman, R.L., Tyler, S.C. and Devonshire, A.L. 1999. Relationship between amount of esterase and gene copy number in insecticide-resistant *Myzus persicae* (Sulzer). *Biochem. J.* **339**(3): 737-742.
- Fournier, D., Bride, J. M., Poirie, M., Berge, J. B. and Plapp, F. W. 1992a. Insect glutathione S-transferases. Biochemical characteristics of the major forms from house flies susceptible and resistant to insecticides. *J. Biol. Chem.* **267**(3): 1840-1845.
- Fournier, D., Bride, J.M., Hoffmann, F. and Karch, F. 1992b. Acetylcholinesterase: two types of modifications confer resistance to insecticide. *J. Biol. Chem.* **267**(20):14270-14274.
- Fournier, D., Cuany, A., Pralavorio, M., Bride, J.M. and Berge, J.B. 1987. Analysis of methidathion resistance mechanisms in *Phytoseiulus persimilis*. *A.H. Pestic. Biochem. Physiol.* **28**: 271-278.
- Fournier, D., Mutero, A., Pralavorio, M. and Bride, J.M. 1993. *Drosophilla* acetylcholinesterase: mechanisms of resistance to organophosphates. *Chem. Biol. Interact.* **87**(1-3): 233-238.

- Franco, O.L., Rigden, D.J., Melo, F.R., Bloch, C., Silva, C. and Grossi-de-Sa, M.F. 2000. Activity of wheat α -amylase inhibitors towards bruchid α -amylases and structural explanation of observed specificities. *Eur. J. Biochem.* **267**: 2166-2173.
- Franco, O.L., Rigden, D.J., Melo, F.R. and Grossi-de-Sa, M.F. 2002. Plant α -amylase inhibitors and their interaction with insect α -amylases structure, function and potential for crop protection. *Eur. J. Biochem.* **269**: 397-412.
- Fridovich, I. 1977. Oxygen is toxic. *Bioscience.* **27**: 462.
- Funaki, E., Dauterman, W. C. and Motoyama, N. 1994. *In vivo* and *In vitro* metabolism of fenvalerate in pyrethroid resistant houseflies. *Pestic. Sci.* **19**: 43- 52.
- Georghiou, G.P. and Pasteur, N. 1978. Electrophoretic esterase patterns in insecticide resistant and susceptible mosquitoes. *J. Econ. Entomol.* **71**: 201-205.
- Georghiou, G.P. and Pasteur, N. 1980. Organophosphate resistance and esterase pattern in a natural population of the southern house mosquito from California. *J. Econ. Entomol.* **73**: 489-492.
- Ghoshal, D., Sen, S.K. and Goyal, A. 2001. Introduction and expression of cowpea trypsin inhibitor (CpTI) gene in transgenic tobacco. *J. Plant Biochem. Biotech.* **10**: 19-25.
- Gilmour, D. 1961. *The Biochemistry of Insects*. Academic Press, New York, 343 p.
- Glover, P.M., Das, C.M. and Mukherjee, T.D. 1961. Pesticide residue and taint in tea. *Span.* **4**(3): 137-140.
- Gopalan, M. 1976. Studies on salivary enzymes of *Ragmus importunitas* Distant (Hemiptera: Miridae). *Current Sc.* **45**(5): 188-189.
- Gordon, H. T. 1961. Nutritional factors in insect resistance to chemicals. *Annu. Rev. Entomol.* **6**: 27-54.

- Grant, D. F., Dietze, E. C. and Hammock, B. D. 1991. Glutathione S-transferase isozymes in *Aedes aegypti*: purification, characterization, and isozyme-specific regulation. *Insect Biochem.* **21**(4): 421-433.
- Green, E. E. 1890. Insect pest of tea plant. Colombo, pp. 103-104.
- Grubor-Lajsic, G., Block, W., Telesmanic, M., Javanovic, A., Stevanovic, D. and Baca, F. 1997. Effect of cold acclimation on the antioxidant defense system of two larval Lepidoptera (Noctuidae). *Arch. Insect Biochem. Physiol.* **36**: 1-10.
- Habig, H.W., Pabst, J.M. and Jakoby, B.W. 1974. Glutathione S-transferases, the first enzymatic step in mercapturic acid formation. *J. Biol. Chem.* **249**: 7130-7139.
- Hainsworth, E. 1952. *Tea pests and diseases and their control with special reference to north-east India*. W. Heffer and Sons Ltd., Cambridge, 130 p.
- Halliday, W.R. 1988. Tissue specific esterase and malathion carboxylesterase activity in larvae of malathion-resistant *Plodia interpunctella* (Hubner) (Lepidoptera: Pyralidae). *J. Stored. Prod. Res.* **24**: 91-99.
- Hama, H. 1976. Modified and normal cholinesterases in the respective strains of carbamate-resistant and susceptible green rice leafhoppers, *Nephotettix cincticeps*, Uhler (Hemiptera: Cicadellidae). *Appl. Entomol. Zool.* **11**: 239-247.
- Hampton, R.E. 1963. Activity of some soluble oxidase in carrot slices infected with *Thielaviopsis basicola*. *Phytopathology.* **53**: 306-333.
- Harold, J. A. and Ottea, J. A. 1997. Toxicological significance of enzyme activities in profenofos-resistant tobacco budworms, *Heliothis virescens* (F.). *Pestic. Biochem. Physiol.* **58**(1): 23-33.
- Hayes, J. D. and Wolf, C. R. 1988. Role of glutathione transferases in drug resistance. In: *Glutathione Conjugation: Mechanisms and Biological Significance*. (Eds) Sies, H. and Ketterer, B.; Academic Press, London, pp. 315-355.

- Hayes, J.D. and Pulford, D.J. 1995. The Glutathione S-transferase supergene family- Regulation of GST and the contribution of the isozymes to cancer chemoprotection and drug resistance. *Crit. Rev. Biochem. Mol. Biochem.* **30**: 445-600.
- Hemingway, J. 1982. The biochemical nature of malathion resistance in *Anopheles stephensi* from Pakistan. *Pestic. Biochem. Physiol.* **17**: 149-155.
- Hemingway, J. 1983. The genetics of malathion resistance in *Anopheles stephensi* from Pakistan. *Trans. Ro. Soc. Trop. Med. Hyg.* **77**: 106-108.
- Hemingway, J. and Karunaratne, S.H.P.P. 1998. Mosquito carboxylesterases: A review of the molecular biology and biochemistry of a major insecticide resistance mechanism. *Med. Vet. Entomol.* **12**: 1-12.
- Herath, P. R. J. and Davidson, G. 1981. Studies on the nature of malathion resistance in population of *Anopheles stephensi* from southern Iran. *Mosq. News.* **41**: 531-534.
- Heuval, M. J. and Cochran, D. G. 1965. Cross-resistance to organophosphorus compounds in malathion and diazinon-resistant strains of *Blattella germanica*. *J. Econ. Entomol.* **58**: 872-874.
- Hill, D. S. 1983. *Agricultural insect pests of the tropics and their control*. Cambridge University Press.
- Homes, R.S. and Masters, C.J. 1967. The developmental multiplicity and isozyme status of cavian esterases. *Biochem. Biophys. Acta.* **132**: 379-399.
- Hori, K. 1970a. Some properties of amylase in the salivary gland of *Lygus disponi* (Hemiptera). *J. Insect Physiol.* **16**: 373-386.
- Hori, K. 1970b. Some properties of proteases in the gut and in the salivary gland of *Lygus disponi* Linnavuori (Hemiptera, Miridae). *Res. Bull. Obihiro Univ.* **6**: 318-324.

- Hori, K. 2000. Possible causes of disease symptoms resulting from the feeding of phytophagous Heteroptera. In: *The economic importance of Heteroptera*. (Eds) Schaefer, C.W. and Panizzi, A.R.; CRC Press, Boca Raton, FL, pp.11-35.
- Hori, K., Atalay, R. and Araki, S. 1981. Digestive enzymes in the gut and salivary gland of the adult *Haematobia irritans* (Diptera: Muscidae). *Appl. Entomol. Zool.* **16**: 16-23.
- House, H.L. 1974. Digestion. In: *The Physiology of Insecta*. (Ed) Rockstein, M.; Academic Press, New York, pp. 63-120.
- Hubert, J., Doleckova-Maresova, L., Hyblova, J., Kudlikova, I., Stejskal, V. and Mares, M. 2005. *In vitro* and *in vivo* inhibition of α -amylases of stored-product mite *Acarus siro*. *Exp. Appl. Acarol.* **35**: 281-291.
- Hughes, P.B. and Devonshire, A.L. 1982. The biochemical basis of resistance to organophosphorous insecticides in the sheep blowfly, *Lucilia cuprina*. *Pestic. Biochem. Physiol.* **18**: 289-297.
- Hughes, P.B. and Raftos, R.A. 1985. Genetics of an esterase associated with resistance to organophosphorus insecticides in the sheep blowfly, *Lucilia cuprina* (Wiedemann) (Diptera: Calliphoridae). *Bull. Ent. Res.* **75**: 535-544.
- Hutson, J. C. 1932. Some insect pests of tea in Ceylon. *Trop. Agriculturist.* **79**: 3-18.
- Jayaraman, J. 1981. *Laboratory Manual In Biochemistry*, Wiley Eastern Limited, New Delhi, 132-133 pp.
- Jayawardena, K. G. I., Karunaratne, S. H. P. P., Ketterman, A. J. and Hemingway, J. 1994. Determination of the role of elevated B2 esterase in insecticide resistance in *Culex quinquefasciatus* (Diptera: Culicidae) from studies on the purified enzyme. *Bull. Ent. Res.* **84**: 39-44.
- Jiang, Y. and Miles, P.W. 1993. Responses of a compatible lucerne variety to attack by spotted alfalfa aphid: changes in the redox balance in affected tissues. *Entomol. Exp. Appl.* **67**: 263-274.

- Jongsma, M.A. and Bolter, C. 1997. The adaptation of insects to plant protease inhibitors. *J. Insect Physiol.* **43**(10): 885-895.
- Kanga, L.H.B. and Plapp, F.W. Jr. 1995. Target site insensitivity as the mechanism of resistance to organophosphorus, carbamate, and cyclodiene insecticides in tobacco budworm adults. *J. Econ. Entomol.* **88**(5): 1150-1157.
- Kao, C.H., Hung, C.F. and Sun, C.N. 1989. Parathion and methyl parathion resistance in diamondback moth (Lepidoptera: Plutellidae) larvae. *J. Econ. Entomol.* **82**: 1299-1304.
- Kao, L.R., Motoyama, N. and Dauterman, W.C. 1984. Studies on hydrolyases in various house fly strains and their role in malathion resistance. *Pestic. Biochem. Physiol.* **22**: 86.
- Karban, R. and Agrawal, A.A. 2002. Herbivore offense. *Annu. Rev. Ecol. Syst.* **33**: 641-664.
- Kazzazi, M., Badani, A.R. and Hosseinkhani, S. 2005. Biochemical characterization of α -amylase of Sunn pest, *Eurygaster integriceps*. *Entomol. Sci.* **8**: 371-377.
- Kilavuka, C.I. 1990. Reports of pests and diseases, Kenya. *Tea.* **(1)**: 6-8.
- Knight, A.L. and Norton, G.W. 1989. Economics of agricultural pesticide resistance in arthropods. *Annu. Rev. Entomol.* **34**: 293-313.
- Kotze, A.C. and Rose, H.A. 1987. Glutathione S-transferase in the Australian sheep blowfly, *Lucilia cuprina* (Wiedemann). *Pestic. Biochem. Physiol.* **29**: 77.
- Krueger, H.F. and O'Brien, R.D. 1959. Relationship between metabolism and differential toxicity of malathion in insects and mice. *J. Econ. Entomol.* **52**: 1063-1067.
- Ku, C. C., Chiang, F.M. and Hsin, C. Y. 1994. Glutathione transferase isozymes involved in insecticide resistance of diamondback moth larvae. *Pestic. Biochem. Physiol.* **50**:191-197.
- Kumar, R. 1970. Occurrence of protease in the salivary glands of cocoa- capsids (Heteroptera, Miridae). *J. New York Entomol. Soc.* **78**:198-200.

- Kunitz, M. 1947. Crystalline soy bean trypsin inhibitor, general properties. *J.Gen. Physiol.* **30**: 291-310.
- Kuwahara, M. 1984. Studies on the resistance of the Kanzawa spider mite, *Tetranychus kanzawai*, Kishida, to acaricides. *Bull.Natl. Inst. Agric. Sc.* **39**:1-75.
- Lalah, J.O., Chien, C.I., Motoyama, N. and Dauterman, W.C. 1995. Glutathione S-transferases: α -naphthyl acetate activity and possible role in insecticide resistance. *J. Econ. Entomol.* **88**(4): 768-770.
- Larocque, A.M. and Houseman, J.G. 1990. Effect of ingested soybean, ovomucoid and corn protease inhibitors on digestive processes of the European corn borer, *Ostrinia nubilalis* (Lepidoptera: Pyralidae). *J. Insect Physiol.* **36**: 691-697.
- Laurema, S. and Varis, A.L. 1991. Salivary aminoacids in *Lygus* (Heteroptera, Miridae). *Insect Biochem.* **21**: 759-765.
- Laurema, S., Varis, A. L., and Miettinen, H. 1985. Studies on enzymes in the salivary glands of *Lygus rugulipennis* (Hemiptera: Miridae). *Insect Biochem.* **15**: 211-224.
- Lazarevic, J. and Mataruga, V.P. 2003. Nutritive stress effects on growth and digestive physiology of *Lymatria dispar* larvae. *Jugoslov. Med. Biochem.* **22**: 53-59.
- Leach, R. and Smee, C. 1933. Gnarled stem canker of tea caused by capsid bug (*Helopeltis bergrothi* Reut.). *Ann. Appl. Biol.* **20**: 691-706.
- Lecadet, M. M. and Dedonder, R. 1966. Les proteases de *Pieris brassicae*. I. Purification et properties. *Bull. Soc. Chim. Biol.* **48**: 631-660.
- Lee, S. and Clark, J.M. 1996. Tissue distribution and biochemical characterization of carboxylesterases associated with permethrin resistance in a near isogenic strain of Colorado potato beetle. *Pestic. Biochem. Physiol.* **56**: 208-219.

- Lee, C.Y., Hemingway, J., Yap, H.H. and Chong, N.L. 2000. Biochemical characterization of insecticide resistance in the German cockroach, *Blattella germanica*, from Malaysia. *Med. Vet. Entomol.* **14**: 11-18.
- Leefmans, S. 1916. Bijdrage tot het *Helopeltis*-vraagstuk voor de Three. (Contribution to the *Helopeltis* problem of tea). Entomologisch Assistent aan het Laboratorium voor plantenziekten van het Department van Landbouw, Nijverheid en Handel., Drukkerij, Ruygrok & Co. – Batavia. No. 26, pp. 201-208.
- Leeuwen, T.V., Pottelberge, S.V. and Tirry, L. 2005. Comparative acaricide susceptibility and detoxifying enzyme activities in field-collected resistant and susceptible strains of *Tetranychus urticae*. *Pest Manag. Sci.* **61**: 499-507.
- Legendre, R. 1978. Quelques progres recents concernant l'anatomie des araignees (systeme nerveux sympathique et appareil digestif). In: *Arachnology, Seventh International Congress Symposium of the Zoological Society of London*. (Ed) Merret, P.; Academic Press, London, pp. 379-388.
- Lenz, C.J., Kang, J., Rice, W.C., Mc Intosh, A.H., Chippendale, G.M. and Schubert, K.R. 1991. Digestive proteinases of larvae of the corn ear worm, *Heliothis zea*: Characterization, distribution and dietary relationships. *Arch. Insect Biochem. Physiol.* **16**: 201-212.
- Lever, R.J.A.W. 1949. The tea mosquito bugs (*Helopeltis* spp.) in the Cameron highlands. *Malayan Agric. J.* **32**: 91-109.
- Levitin, E. and Cohen, E. 1998. The involvement of acetylcholinesterase in resistance of the California red scale *Aonidiella aurantii* to organophosphorus pesticides. *Entomol. Exp. Appl.* **88**: 115-121.
- Lewis, P.R. and Shute, C.C.D. 1966. The distribution of cholinesterase in cholinergic neurons demonstrated with the electron microscope. *J. Cell. Sci.* **1**: 381-390.
- Lima, D. C.P.E., Ondieki, J.J., Mbogo, O.J. and Okioma, B.N. 1977. A summary on survey of tea pests and diseases in Kenya in 1977. *Tea in East Africa.* **18(1)**: 20-25.

- Lowry, O.H., Rosebrough, N.J., Farr, A.L. and Randall, R.J. 1951. Protein measurement with Folin phenol reagent. *J. Biol. Chem.* **193**: 265-275.
- Loxdale, H. D. and Hollander, J. D. 1989. *Electrophoretic studies on agricultural pests*. Oxford Univ. Press, New York.
- Loxdale, H.D. 1993. Isozyme and protein profiles of insects of agricultural and horticultural importance, In: *The Identification and Characterization of Pest Organisms. Proceedings of the Third Workshop on the Ecological Foundations of Sustainable Agriculture (WEFSA III)*. (Ed) Hawksworth, D.L.; CAB International, Wallingford, UK, pp. 337-375.
- Maa, C.J.W. and Chuang, M.L. 1983. Esterase of diamond-back moth, (*Plutella xylostella* L.): Enzymatic properties of larval esterases. *Bull. Inst. Zool. Acad. Sinica.* **22**: 123-131.
- Maa, W. C. and Terrier, L. C. 1983. Age dependent variation in enzymic and electrophoretic properties of house fly (*Musca domestica*) carboxylesterases. *Comp. Biochem. Physiol.* **74**: 461-467.
- Maa, W. C. J. and Liao, S. C. 2000. Culture dependent variation in esterase isozymes and malathion susceptibility of diamond-backmoth, *Plutella xylostella* (Linnaeus). *Zool. Stud.* **39**: 375-386.
- Madhusudhan, V.V. and Miles, P.W. 1993. Detection of enzymes secreted in the saliva of the spotted alfalfa aphid, *Therioaphis trifolii* (Monell) *f. maculata* Hemiptera: Aphididae). In: *Pest control and sustainable*. (Eds) Corey, S.A., Dali, D.J. and Milne, W.M.; CSIRO, Australia, pp. 333-334.
- Madhusudhan, V.V., Taylor, G.S. and Miles, P.W. 1994. The detection of salivary enzymes of phytophagous Hemiptera: a compilation of methods. *Ann. Appl. Biol.* **124**: 405-412.
- Mahanta, PK., Hazarika, M. and Takeo, T. 1985. Flavour volatiles and lipids in various components of tea shoots *Camellia sinensis* (L.) O. Kuntze. *J. Sci. Food Agric.* **36**: 1130-1132.

- Manchenko, G.P. 1994. 2.5.18. –glutathione S-transferase. In: *Handbook of detection of enzymes on electrophoretic gels.* (Ed) Manchenko, G.; CRC Press, Boca Raton, FL, pp. 124-125.
- Mann, H.H. 1907. Individual and seasonal variations in *Helopeltis theivora* Waterhouse, with description of new species of *Helopeltis*. *Ent. Mem. Agri. Dept. Ind.* **1**: 275-337.
- Mann, H.H. and Antram, C.B. 1906. Red slug caterpillar. Memo. No. 5. *Indian Tea Ass.* 12 p.
- Mantile, P. 1980. Catabolism of chlorophyll: Involvement of peroxidase? *Zeitschrift fuer Pflanzenphysiologie.* **99**: 475-478.
- Maqbool, S.B., Riazuddin, S., Loc, N.T., Gatehouse, A.M.R., Gatehouse, J.A. and Christou, P. 2001. Expression of multiple insecticidal genes confers broad resistance against a range of different rice pests. *Molecular Breeding.* **7**: 85-93.
- Matsumura, F. 2003. Insecticides. In: *Encyclopedia of Insects* (Eds) Resh, V.H. and Carde, R.T.; Academic Press, USA, pp. 566-569.
- Matsumura, F. and Brown, A. W. A. 1963. Studies on carboxylesterase in malathion-resistant *Culex tarsalis*. *J. Econ. Entomol.* **56**: 381-388.
- Matsumura, F. and Voss, G. 1964. Mechanism of malathion and parathion resistance in the two-spotted spider mite, *Tetranychus urticae*. *J. Econ. Entomol.* **57**: 911-917.
- Mehrotra, K.N. and Phokela, A. 1996. Insecticide resistant insect pest management. In: *Recent Advances in Indian Entomology.* (Ed) Lal, O.P.; APC Publications Pvt. Ltd., New Delhi, pp. 197-203.
- Mendiola-Olaya, E., Valencia-Jimenez, A., Valdes-Rodriguez, S., Delano-Frier, J. and Blanco-Labra, A. 2000. Digestive amylase form larger grain borer, *Prostephanus truncates* Horn. *Comp. Biochem. Physiol.* **126 B**: 425-433.
- Metcalf, R.L. 1980. Changing role of insecticides in crop protection. *Annu. Rev. Entomol.* **25**: 219-256.

- Miles, P.W. 1964. Studies on the salivary physiology of plant-bugs: oxidase activity in the salivary apparatus and saliva. *J. Insect Physiol.* **10**: 121-129.
- Miles, P.W. 1968. Insect secretions in plants. *Annu. Rev. Phytopath.* **6**: 137-164.
- Miles, P.W. 1969. Interaction of plant phenols and salivary phenolases in the relationship between plants and Hemiptera. *Entomol. Exp. Appl.* **12**: 736-744.
- Miles, P.W. 1972. The saliva of Hemiptera. *Adv. Insect Physiol.* **9**: 188-256.
- Miles, P.W. 1985. Dynamic aspects of the chemical relation between the rose aphid and rose buds. *Entomol. Exp. Appl.* **37**: 129-135.
- Miles, P.W. 1987. Feeding process of Aphidoidea in relation to effects on their food plants. In: *Aphids: their biology, Natural Enemies and Control* Vol. 2A. (Eds) Minks, A.K. and Harrewijn, P.; Elsevier Science Publishers, Amsterdam, pp. 321-339.
- Miles, P.W. 1999. Aphid saliva. *Biol. Rev.* **74**: 41-85.
- Miles, P.W. and Oertli, J.J. 1993. The significance of antioxidants in the aphid-plant interaction: the redox hypothesis. *Entomol. Exp. Appl.* **67**: 275-283.
- Miles, P.W. and Peng, Z. 1989. Studies on the salivary physiology of plant bugs: detoxification of phytochemicals by the salivary peroxidase of aphids. *J. Insect Physiol.* **35**: 865-872.
- Miles, P.W. and Sloviak, D. 1970. Transport of whole protein molecules from blood to saliva of a plant bug. *Experientia.* **26**: 611.
- Miller, N.C.E. 1941. Insects associated with cocoa (*Theobroma cacao*) in Malaya. *Bull. Ent. Res.* **32**: 1-15.
- Miyamoto, J. and Suzuki, T. 1973. Metabolism of tetramethrin in house flies *in vivo*. *Pestic. Biochem. Physiol.* **3**: 30-41.
- Mkwaila, B. 1983. Red spider mite. *Quart Newlt.* **72**: 15.

- Mohan, M. and Gujar, G. T. 2003. Local variation in susceptibility of the diamondbackmoth *Plutella xylostella* (Linnaeus) to insecticides and role of detoxification enzymes. *Crop Protection*. **22**: 495-504.
- Motoyama, N. and Dauterman, W.C. 1974. The role of non-oxidative metabolism in organophosphorous resistance. *J. Agric. Food. Chem.* **22**: 350-356.
- Motoyama, N. and Dauterman, W.C. 1975. Interstrain comparison of glutathione-dependent reactions in susceptible and resistant house flies. *Pestic. Biochem. Physiol.* **5**: 489-495.
- Mouches, C., Pasteur, N., Berge, J.B., Hyrien, O., Raymond, M., Saint Vincent, B.R.D., Silvestri, M.D. and Georghiou, G.P. 1986. Amplification of an esterase gene is responsible for insecticide resistance in California *Culex* mosquito. *Science*. **238**: 778-780.
- Mukhopadhyay, A., Pradhan, B. and Roy, U. 2001. Preference and consumption of three varieties of tea by the red slug caterpillars (*Eterusia magnifica* Butl.). *Two and a Bud*. **48**(2): 28-29.
- Mulky, M.J. 1993. Chemistry and Pharmacology of Tea. In: *Tea Culture, Processing and Marketing*. (Eds) Mulky, M.J. and Sharma, V.S.; Oxford & IBH Publishing Co Pvt. Ltd, New Delhi, 83 p.
- Mullin, C. A. and Croft, B.A. 1983. Host-related alterations of detoxification enzymes in *Tetranychus urticae* (Acari: Tetranychidae). *Environ. Entomol.* **12**: 1278-1282.
- Muraleedharan, N. 1987. Entomological research in tea in southern India. *J. Coffee Res.* **17**: 80-83.
- Muraleedharan, N. 1993. Ecology and Management of tea pests. In: *Tea culture, Processing and Marketing*. (Eds) Mulky, M.J. and Sharma, V.S.; Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi, pp. 129-144.
- Muraleedharan, N. and Radhakrishnan, B. 1989. Recent studies on tea pest management in South India. *Bull. UPASI Tea Sci. Dept.* **43**: 16-29.

- Muraleedharan, N. and Selvasundaram, R. 2002. An IPM package for tea in India. *Planters' Chron.* **98**(4): 107-124.
- Muraleedharan, N., Selvasundaram, R. and Radhakrishnan, B. 2001. Parasitoids and predators of tea pests in India. *J. Plantn. Crops.* **29**(2): 1-10.
- Muraleedharan, N. 1983. Tea Entomology: an overview. Occasional paper of Entomology Research Institute, Loyola College, Madras, **41**: 1-20.
- Muraleedharan, N. 1991. Pest Management in Tea. UPASI Tea Research Institute, Seshan Printers, Coimbatore, pp. 60-61.
- Murphy, R.W., Sites J.W. Jr., Buth, D.G. and Haufler, C.H. 1996. Proteins: isozyme electrophoresis. In: *Molecular Systematics*. (Eds) Hillis, D.M., Moritz, C. and Mable, B. K.; 2nd Edn, Sinauer Associates Inc. MA, pp. 51-120.
- Mutero, A., Pralavorio, M., Simeon, V. and Fournier, D. 1992. Catalytic properties of cholinesterases: importance of tyrosine 109 in *Drosophila* protein. *Neuroreport.* **3**(1): 39-42.
- Needam, P.H. and Sawicki, R.M. 1971. Diagnosis of resistance to organophosphorous insecticides in *Myzus persicae*. *Nature (Lond.)*. **230**: 125-126.
- Nuorteva, P. 1954. Studies on the salivary enzymes of some bugs injuring wheat kernels. *Annals. Entomol. Fennic.* **20**: 102-124.
- O'Brien, R. D. 1960. Allelic genes in the house fly producing modified enzymes that cause organophosphorus resistance. *Science.* **132**: 298-299.
- Ono, M., Jonathan, S. R. and Siegfried, B.D. 1994. Characterization of general esterases from susceptible and parathion-resistant strains of the greenbug (Homoptera: Aphididae). *J. Econ. Entomol.* **87**(6): 1430-1436.
- Oomen, P.A. 1982. Studies on population dynamics of the scarlet mite, *Brevipalpus phoenicis*, a pest of tea in Indonesia. *Meded Landbouwhogen School, Wageningen, Nederland.* **82**: 1-88.

- Oppenoorth, F.J. 1965. Biochemical genetic of insecticide resistance. *Annu. Rev. Entomol.* **10**: 185-206.
- Oppenoorth, F.J. 1982. Two different paraxon- resistant acetylcholinesterase mutants in the housefly. *Pestic. Biochem. Physiol.* **18**: 26-27.
- Oppenoorth, F.J. 1985. Biochemistry and genetics of insecticide resistance. In: *Comparative Insect Physiology, Biochemistry and Pharmacology*. (Eds) Kerkut, G.A. and Gilbert, L.I.; Vol 12. Pergamon Press, Elmsford, Oxford, pp. 731-773.
- Ottea, J.A. and Plapp, F.W. Jr. 1984. Gluththione S-transferase in the house fly: biochemical and genetic changes associated with induction and insecticide resistance. *Pestic. Biochem. Physiol.* **22**: 203-208.
- Owusu, E.O., Horiike, M. and Hirano, C. 1996. Polyacrylamide gel electrophoretic assessments of esterases in cotton aphid (Homoptera: Aphididae) resistance to dichlofos. *J. Econ. Entomol.* **89**(2): 302-306.
- Ozaki, K. and Kassai, T. 1970. Biochemical genetic of malathion resistance in the smaller brown planthopper, *Laodelphax striatellus*. *Entomol. Exp. Appl.* **13**: 162-172.
- Packer, L. 1984. Oxygen radicals in biological system. In: *Methods in enzymology*, Vol. 105. (Ed) Harcourt, B.J.; Academic Press, London, pp. 273-280.
- Park, N.J. and Kamble, S.T. 2001. Decapttation impacting effect of topically applied chlorpyrifos on acetylcholinesterase and general eserases in susceptible and resistant German Cockroaches (Dictyoptera: Blattellidae). *J. Econ. Entomol.* **94**(2): 499-505.
- Pathak, S.K. 2004. Population dynamics and feeding impact of some sucking pests on Darjeeling tea. Ph.D. Thesis, University of North Bengal, West Bengal.
- Peal, S.E. 1873. The tea-bug of Assam. *J. Agri. Hort.Soc.In.* (New series) **4**(1): 126-132.
- Peng, Z. and Miles, P.W. 1988a. Acceptability of catechin and its oxidative condensation products to the rose aphid, *Macrosiphum rosae*. *Entomol. Exp. Appl.* **34**: 255-256.

- Peng, Z. and Miles, P.W. 1988b. Studies on the salivary physiology of plant bugs: function of the catechol oxidase of the rose aphid. *J. Insect Physiol.* **34**: 1027-1033.
- Poirie, M., Raymond, M. and Pasteur, N. 1992. Identification of two distinct amplification of the esterases B locus in *Culex pipiens* (L.) mosquitoes from Mediterranean countries. *Biochem. Genet.* **30**: 13-26.
- Prapanthadara, L. A., Hemingway, J. and Ketterman, A. J. 1993. Partial purification and characterization of glutathione S-transferases involved in DDT resistance from the mosquito, *Anopheles gambiae*. *Pestic. Biochem. Physiol.* **47**: 119-133.
- Ranson, H., Prapanthadara, L.A. and Hemingway, J. 1997. Cloning and characterization of two glutathione S-transferases from a DDT-resistant strain of *Anopheles gambiae*. *Biochem. J.* **324**: 97.
- Ranson, H., Rossiter, L., Ortelli, F., Jensen, B., Wang, X., Roth, C.W., Collins, F.H. and Hemingway, J. 2001. Identification of a novel class of insect glutathione S-transferases involved in resistance to DDT in the malaria vector *Anopheles gambiae*. *Biochem. J.* **359** (2): 295-304.
- Rao, G.N. 1970. *Helopeltis*: A break-through in its control. *Bull. UPASI Tea Sci. Dept.* **28**: 21-28.
- Rao, G.N. and Murthy, R.L.N. 1976. Economics of tea pest control. *Bull. UPASI Tea Sci. Dept.* **33**: 88-100.
- Rao, G.N. and Subramaniam, H. 1968. Control of mites in tea results in increased yields. *Planters' Chron.* **63**: 412-413.
- Rattan, P.S. 1984. Incidence and losses caused by *Helopeltis schoutedeni* (Mosquito bug) from 1980-1984. Tea Res. Foundation (Central Africa). *Q. Newlett.* **75**: 6-12.
- Rattan, P.S. 1987. Economic threshold levels for *Helopeltis schoutedeni* (Mosquito bug), a major pest of tea in Malawi. Tea Res. Foundation (Central Africa). *Q. Newlett.* **85**: 8-17.
- Rattan, P.S. 1988. Tea Planters' Handbook, 12 pest and diseases, their identification and control. 12.4 Insect pests (a) mosquito bug, pp.1-4.

- Rau, S.A. 1952. Report of the Assistant Scientific Officer and Entomologist (1951-52), Scientific Dept., UPASI, pp. 15-18.
- Reidy, G.F., Rose, H.A., Visetson, S. and Murray, M. 1990. Increased glutathione S-transferase activity and glutathione content in an insecticide-resistant strain of *Tribolium castaneum* (Herbst). *Pestic. Biochem. Physiol.* **36**: 269-276.
- Riley, D.G., Tan, W.J. and Wolfenbarger, D. 2000. Activities of enzymes associated with inheritance of bifenthrin resistance in the silverleaf whitefly, *Bemisia argentifolii*. *Southwest Entomol.* **25**: 201-211.
- Roberts, G.R. 1974. Polar lipid composition of the leaves and seeds from the tea plant (*Camellia sinensis* L.). *J. Sci. Food Agric.* **25**: 473-475.
- Robinson, J.M., Kamovsky, M.J., Stoward, P.J. and Lewis, P.R. 1991. Oxidases. In: *Histochemistry Theoretical and Applied* Vol. 3. (Eds) Stoward, P.J. and Pearse, A.G.E. Churchill Livingstone, Edinburgh, pp. 95-115.
- Rodman, D.H. and Miller, D.J. 1992. Enzyme-activities associated with salivary-glands of the froghopper *Eoscarta carnifex* (F.) (Homoptera: Cercopoidae)- possible role of salivary catalase in phytotoxicity. *Aust. J. Zool.* **40**(4): 365-370.
- Rubiolo, E.R., Canavoso, L.E. and Wells, M.A. 2000. Triacylglycerol lipase from the midgut of larval *Manduca sexta*: properties and partial characterization. In: Abstract book II- Insect Physiology Neurosciences Immunity and Cell Biology XXI-International Congress of Entomology, Brazil, August 20-26, 2000.
- Rufingier, C., Pasteur, N., Lagnel, J., Martin, C. and Navajas, M. 1999. Mechanisms of insecticide resistance in aphid *Nasonovia ribisnigri* (Mosley) (Homoptera: Aphididae) from France. *Insect Biochem. Molec. Biol.* **29** (4): 385-391.
- Sadasivam, S. and Manickam, A. 1996. *Biochemical Methods*, 2nd edn. New Age International (P) Limited, New Delhi and TNAU, Coimbatore, 116-126 pp.

- Sahoo, B., Sahoo, S.K. and Samchadhury, A.K. 2003. Studies on the toxicity of newer molecules against tea red spider mite. p. 301. In: *Proceedings of the National Symposium on Frontier Areas of Entomological Research*. IARI, New Delhi, India.
- Saito, T. and Hama, H. 2000. Carboylesterase isozymes responsible for organophosphate resistance in the cotton aphid, *Aphis gossypii* Glover (Homoptera: Aphididae). *Appl. Entomol. Zool.* **35**(1):171-175.
- Salinas, A.E. and Wong, M.G. 1999. Glutathione S –transferases – A review. *Current Med. Chem.* **6**: 279-309.
- Sannigrahi, S. and Talukder, T. 2003. Pesticide use patterns in dooars tea industry. *Two and a Bud.* **50**: 35-38.
- Sarker, M. and Mukhopadhyay, A. 2003. Expression of esterases in different tissues of the tea-pest, *Helopeltis theivora* exposed and unexposed to synthetic pesticide sprays from Darjeeling foothills and plains. *Two and a Bud.* **50**: 28-30.
- Sarker, M. and Mukhopadhyay, A. 2006a. A preliminary study on Host plant related changes of general esterases in *Buzura suppressaria* (Lepidoptera: Geometridae), a major defoliator of tea in the Darjeeling foothills and adjoining plains in India. *S. L. J. Tea Sci.* **71**(1): 1-7.
- Sarker, M. and Mukhopadhyay, A. 2006b. Tissue level variation in esterases of red slug caterpillar, *Eterusia magnifica* Butl. (Lepidoptera : Zygaenidae), exposed and unexposed to pesticide spray of tea plantations of Darjeeling plains. *J. Plantn. Crops.* **34**(2): 94-97.
- Sarker, M. and Mukhopadhyay, A. 2006c. General esterases of *Oligonychus coffeae* (Acarina: Tetranychidae) occurring in pesticide-treated and untreated tea plantations of Darjeeling plains, India. *J. Appl. Zool. Res.* **17**(1): 67-71.

- Sarker, M., Pradhan, B. and Mukhopadhyay, A. 2007. Feeding biology and digestive enzymes of *Buzura suppressaria* Guen. and *Eterusia magnifica* Butl., two major defoliating pests of *Camellia sinensis* from Darjeeling plains, India. *Mun. Ent. Zool.* **2**(1): 29-38.
- Sawicki, R., Singh, S.P., Mondal, A.K., Benes, H. and Zimnaik, P. 2003. Cloning, expression and biochemical characterization of one Epsilon-class (GST-3) and ten Delta- class (GST-1) glutathione S-transferases from *Drosophila melanogaster*, and identification of additional nine members of the Epsilon class. *Biochem. J.* **370**: 661-669.
- Sawicki, R.M., Devonshire, A.L., Rice, A.D., Moores, G.D., Perzing, S.M. and Cameron, A. 1978. The detection and distribution of organophosphorus and carbamate insecticide resistant *Myzus persicae* (Sulzer) in Britain in 1976. *Pestic.Sc.* **9**: 189-201.
- Schoonhoven, L.M., Jermy, T. and van Loon, J.J.A. 1998. *Insect-Plant Biology From physiology to evolution*. Chapman & Hall. London.
- Schulten, G.G.M. 1990. Needs and constraints of integrated pest management in developing countries. *Med.Fac.Landbouw. Rijsuniv.Gent.* **55**: 2-216.
- Sen, A.R. and Chakraborty, R.P. 1964. Estimation of losses of crop from pests and diseases of tea from simple surveys. *Biometrics.* **20**: 492-504.
- Sengupta, G.C. and Miles, P.W. 1975. Studies on the susceptibility of varieties of apple to the feeding of two strains of wooly aphis (Homoptera) in relation to the chemical content of the tissues of the host. *Aust. J. Agric. Res.* **26**: 157-168.
- Shaw, W.S. 1928. Observations on *Helopeltis* (Tea mosquito blight) for south India tea planters. *Bull. UPASI Sci. Dept.* 56 p.
- Shufran, R.A. and Wilde, G.E. 1996. Description of three isozyme polymorphisms associated with insecticide resistance in greenbug (Homoptera: Aphididae) populations. *J. Econ. Entomol.* **89**: 46-50.
- Shufran, R.A., Wilde, G.E. and Sloderbeck, P.E. 1993. Current distribution of pesticide resistant greenbugs based on gel-electrophoresis. pp. 10-12. In: *Proceedings greenbug workshop and symposium*. Cooperative Extension Service, New Mexico State University, Las Cruces, Albuquerque, NM.

- Siegfried, B.D. and Scott, J.G. 1990. Properties and inhibition of acetylcholinesterase in resistant and susceptible German cockroaches (*Blattella germanica* L.). *Pestic. Biochem. Physiol.* **38**: 122-129.
- Siegfried, B.D. and Scott, J.G. 1992. Biochemical characterization of hydrolytic and oxidative enzymes in insecticide resistant and susceptible strains of the German cockroach (Dictyoptera: Blattellidae). *J. Econ. Entomol.* **85**: 1092-1098.
- Silver, A. 1974. The biology of cholinesterase. In: *Frontiers of biology*. (Eds) Neuberger, A. and Tatum, E.I.; Vol 36, North- Holland, Amsterdam, pp. 1-596.
- Singh, K., Das, S. C., Gope, B., Borthakur, M. and Majumdar, S.K. 1990. Olfactory behavioural response of both sexes of looper moth *Buzura suppressaria* Guen (Lepidoptera: Geometridae) induced by pheromone chemical. *Ind. J. Exp. Biol.* **28**: 783-784.
- Sivakumaran, S. and Mayo, Z.B. 1992. Electrophoretic characterization of esterases in the green bug, *Schizaphis graminum* (Rondani) (Homoptera: Aphididae). *J. Kans. Entomol. Soc.* **64**: 357-362.
- Sivapalan, P. 1999. Pest management in tea. In: *Global Advances in Tea Science*. (Ed) Jain, N.K.; Aravalli Books International (P) Ltd. New Delhi, pp. 625-646.
- Smirle, M.J. 1990. The influence of detoxifying enzymes on insecticide tolerance in honey bee colonies (Hymenoptera: Apidae). *J. Econ. Entomol.* **83**: 715-720.
- Smitsaert, H.R. 1964. Cholinesterase inhibition in spider mites susceptible and resistant to organophosphate. *Science*. **143**: 129-131.
- Smith, E.S.C. 1978. Host and distribution records of *Helopeltis clavifer* (Walker) (Heteroptera: Miridae) in Papua New Guinea. *Papua New Guinea Agri. J.* **29** (1/4): 1-4.
- Snodgrass R.E. 1935. *Principles of Insect Morphology*. Mc Graw-Hill, New York, 667 p.
- Soderlund, D. M. and Bloomquist, J. R. 1990. Molecular mechanism of insecticide resistance. In: *Pesticide resistance in arthropods*. (Eds) Roush, R. T. and Tabashnic, B. E.; Chapman & Hall, London, pp. 237-260.

- Somogyi, M. 1960. Modification of two methods for the assay of amylase. *Clin. Chem.* **6**: 23.
- Steinite, I., Gailite, A. and Lenvish, G. 2004. Reactive oxygen and ethylene are involved in the regulation of regurgitant-induced responses in bean plants. *J. Plant Physiol.* **161**(2): 191-196.
- Stewart, G.A., Catherine H. B., Karen, D.K., Matthew, J. and Phillip, J.T. 1992. A comparative study of allergenic and potentially allergenic enzymes from *Dermatophagoides pteronyssinus*, *D. farinae* and *Euroglyphus maynei*. *Exp. Appl. Acarol.* **16**(1& 2): 165-180.
- Stonedahl, G. M. 1991. The Oriental species of *Helopeltis* (Heteroptera: Miridae): a review of economic literature and guide to identification. *Bull. Ent. Res.* **81**: 465-490.
- Stonedahl, G.M., Malipatil, M.B. and Houston, W. 1995. A new mirid (Heteroptera) pest of cashew in northern Australia. *Bull. Ent. Res.* **85**: 275-278.
- Strobl, S., Maskos, K., Wiegand, G., Huber, R., Gomis-Ruth, F.X. and Glockshuber, R. 1998. A novel strategy for inhibition of α -amylases: yellow meal worm α -amylase in complex with *Ragi* bifunctional inhibitor at 2.5 Å resolution. *Structure.* **6**: 911-921.
- Sundararaju, D. and Sundara Babu, P.C. 1996. Neem pest not a mystery. *Nature.* **381**: 108.
- Sudukov, O.V., Zil-Bermints, I.V., Golovkina, L.S. and Novozhilov, K.V. 1989. Problemy Izbiratel'nosti Deistviya Insektitsidov I Akaritsidov I Ee Znachenie V. *Zashchite Rastenii.* **19**: 64-69.
- Teo, L-H., Hammond, A.M., Woodring, J.P. and Fescemeyer, H.W. 1990. Digestive enzymes of the velvet bean caterpillar (Lepidoptera: Noctuidae). *Ann. Entomol. Soc. Am.* **83**: 820-826.
- Tavares, G.M., Oliveira, M.T.V.A. and Ceron, C.R. 1998. Tissue- specific expression of esterases in *Triatoma infestans* (Triatominae: Heteroptera). *Genet. Mol. Biol.* **21**(4): 1-8.
- Terriere, L.C. 1984. Induction of detoxication enzymes in insects. *Annu. Rev. Entomol.* **29**: 71-88.

- Urbanska, A. and Leszczynski, B. 1992. Biochemical adaptations of cereal aphids to host-plants. pp. 277-279. In: *Proceedings of 8th International Symposium on Insect-Plant Relationships*. (Eds) Menken, S.B.J., Visser, H.J. and Harrewijn, P.; Kluwer Academic Publishers, Dordrecht.
- Urbanska, A., Leszczynski, B., Laskowska, I. and Matok, H. 1998. Enzymic defence of grain aphid against plant phenolics. In: *Aphids in natural and managed ecosystems*. (Eds) Nieto, J.M. and Dixon, A.F.G.; Universidad de Leon, Secretario de Publicaciones, pp.119-124.
- van Asperen, K. 1962. A study of house fly esterases by means of a sensitive colorimetric method. *J. Insect Physiol.* **8**: 401-416.
- Venkata Ram, C.S. 1966. New evidence on the increase of purple mite in tea copper spraying. *Planters' Chron.* **61**: 209-210.
- Villate, F., Ziliani, P., Marcel, V., Menozzi, P. and Fournier, D. 2000. A high number of mutations in insect acetylcholinesterase may provide insecticide resistance. *Pestic. Biochem. Physiol.* **67**(2): 95-102.
- Vontas, J. G., Small, G. J. and Hemingway, J. 2001. Glutathione S-transferases as antioxidant defence agents confer pyrethroid resistance in *Nilaparvata lugens*. *Biochem. J.* **357**(1): 65-72.
- Walker, W.F., Boswell, A.L. and Smith, F.F. 1973. Resistance of spider mites to acaricides: comparison of slide dip and leaf dip methods. *J. Econ. Entomol.* **66**: 549-550.
- Walsh, S.B., Dolden, T.A., Moores, G.D., Kristensen, M., Lewis, T., Devonshire, A.L. and Williamson, M.S. 2001. Identification and characterization of mutations in housefly (*Musca domestica*) acetylcholinesterase involved in insecticide resistance. *Biochem. J.* **359**(1): 175-181.

- Wang, J.J., Cheng, W.X., Ding, W. and Zhi, M.Z. 2004. The effect of the insecticide dichlorvos on esterase activity extracted from psocids, *Liposcelis bosrychophila* and *L. entomophila*. *J. Insect Sc.* **4**: 23-28.
- Wang, J.Y., McCommas, S. and Syvanen, M. 1991. Molecular cloning of a glutathione S-transferase overproduced in an insecticide-resistant strain of the house fly *Musca domestica*. *Mol. Gen. Genet.* **227**: 260-266.
- Watt, G. and Mann, H. H. 1903. The pests and blights of the tea plant. Government Printing Press, Calcutta, 429 p.
- Way, M.J. and Khoo, K.C. 1989. Relationships between *Helopeltis theobromae* damage and ants with special reference to Malaysian cocoa smallholdings. *J. Plant Proct. Tropics.* **6**: 1-11.
- Weatherstone, J. 1992. Historical Introduction. In: *Tea cultivation to consumption*. (Eds) Wilson, K.C. and Clifford, M.N.; Chapman & Hall, pp. 6-8.
- Wei, S.H. Clark, A.G. and Syvanen, M. 2001. Identification and cloning of a key insecticide-metabolizing glutathione-transferase (MdGST-6A) from hyper insecticide resistant strain of the house fly *Musca domestica*. *Insect Biochem. Molec. Biol.* **31**: 1145-1153.
- Wheeler, A.G. Jr. 2001. *Biology of the plant bugs (Hemiptera: Miridae): pests, predators, opportunists*. Cornell University Press, Ithaca, NY.
- Wheelock, C.E., Shan, G. and Ottea, J. 2005. Overview of carboxylesterase and their role in the metabolism of insecticides. *J. Pestic. Sci.* **30**(2): 75-83.
- Whyard, S., Russell, R.J. and Walker, V.K. 1994. Insecticide resistance and malathion carboxylesterase in the sheep blowfly, *Lucilla cuprina*. *Biochem. Genet.* **32**: 9.
- Wood-Mason, J. 1884. Report on the tea-mite and tea-bug of Assam. Taylor and Francis, London, 20 p.
- Xie, Z.L. 1993. Investigation on structure sequence of insect populations in the tea gardens of Gngandong province (China). *Tea in Gngandong.* **1**: 2-10.

- Yang, X., Margolies, D.C., Zhu, K.Y. and Buschman, L.L. 2001. Host plant-induced changes in detoxification enzymes and susceptibility to pesticides in the twospotted spider mite (Acari: Tetranychidae). *J. Econ. Entomol.* **94**(2): 381-387.
- Yang, X., Buschman, L.L., Zhu, K.Y. and Margolies, D.C. 2002. Susceptibility and detoxifying enzyme activity in two spider mite species (Acari: Tetranychidae) after selection with three insecticides. *J. Econ. Entomol.* **95**(2): 399-406.
- Yu, S.J. 1984. Interactions of allelochemicals with detoxification enzymes of insecticide-susceptible and resistant fall armyworms. *Pestic. Biochem. Physiol.* **22**: 60-68.
- Yu, S.J. 1996. Insect glutathione S-transferases. *Zool. Stud.* **35**: 9.
- Yu, S.J. and Terriere, L.C. 1977. Metabolism of (¹⁴C) hydoprene (ethyl 3, 7, 11- trimethyl-2,4- dedecadienoate) by microsomal oxidase and esterase from three species of Diptera. *J. Agric. Food Chem.* **25**(5): 1076-1080.
- Zeng, F. and Cohen, A.C. 2000. Comparison of α -amylase and protease activities of a zoophytophagous and phytozoophagous Heteroptera. *Comp. Biochem. Physiol.* **126A**: 101-106.
- Zhao, G., Rose, R.L., Hodgson, E. and Roe, R.M. 1996. Biochemical mechanisms and diagnostic microassays for pyrethroid, carbamate, and organophosphate insecticide resistance / cross-resistance in the tobacco budworm, *Heliothis virescens*. *Pestic. Biochem. Physiol.* **56**(3): 183-195.
- Zhang, J.P., Wang, J.J., Zhao, Z.M., Dou, W. and Chen, Y. 2004. Effects of simulated acid rain on the physiology of carmine spider mite, *Tetranychus cinnabarinus* (Boisduvals) (Acari: Tetranychidae). *J. Appl. Entomol.* **128**(5): 342-347.
- Zhu, K. Y., Lee, S.H. and Clark, J.M. 1996. A point mutation of acetylcholinesterase associated with azinphosmethyl resistance and reduced fitness in Colorado potato beetle. *Pestic. Biochem. Physiol.* **55**(2): 100-108.

- Zhu, K.Y. and Brindley, W.A.1992. Significance of carboxylesterases and insensitive acetylcholinesterase conferring organophosphate resistance in *Lygus hesperus* populations. *Pestic. Biochem. Physiol.* **43**: 223-231.
- Zhu, K.Y. and Gao, J-R. 1998. Kinetic properties and variability of esterases in organophosphate-susceptible and resistant greenbugs *Schizaphis graminum* (Homoptera: Aphididae). *Pestic. Biochem. Physiol.* **62**: 135-145.
- Zhu, K.Y. and He, F. 2000. Elevated esterases exhibiting arylesterase-like characteristics in an organophosphate-resistant clone of the greenbug, *Schizaphis graminum* (Homoptera: Aphididae). *Pestic. Biochem. Physiol.* **67**: 155-167.