the process of egg production. Section through Prothoracic glands in normal *S. littoralis* larvae (Fig.4), shows group of cells with big rounded nucleus and small mitochondria in the cell cytoplasm. Fig.(4A)for the prothracic gland of the fed larvae , irregular of nuclear membrane, lost of cell membranes, clumping of nuclear chromatin , lysosome noticed in the cytoplasm, fat droplets was observed inside the nucleus, many areas of the cell cytoplasm were encircled by a membrane, leads to the formation of autophagocytic vacuoles, in which cells destroy their own product. Fig. (4B) it is also refereed to as cytoplasmic degeneration leading to sever damage and even death of the cell. The histological changes that noticed between the normal and treated neuroendocrine glands of *S. littoralis* larvae were noticed as increasing in nuclear size, extensiveness of dendrites and mitochondria as a result of overexertion of the cell and increasing of the secretory activity. Fore mentioned changes indicated disorder of the treated neurosecretory glands for balancing hormone secretion which effects metamorphosis, development and reproduction of the resulting moths. Sieber(1982) mentioned that Neem extracts increase the secretion in the neurosecretory cells in pars intercerebralis of *E. varivestis* that transferred through corpora cardiaca which activate for releasing B-ecdyson in great quantities leading to disadvantages in cuticle formation and fat bodies. Mittal *et al.* (1995) recorded that Azadirachtin affected the neuroendocrine system of mosquito larvae. Smagghe et al. (1996) found that Tebufenozide affected the neurosecretory cells of *Plodia interpunctella* and activated the epidermal cells leading to deformation in cuticle formation and disintegrations in cell organelles as a results of hormonal unbalance. Schluter (1985) recorded that corpora allata and corpora cardiaca cell glands increased in size and degenerated as a result of neem extract treatment for *E .vaeivestis*. Endocrine system was affected by growth

regulators such Tebufenozide which cause damage for the cell organelles as a results of imbalance in hormone secretions (Retnakaran *et al.,1*997).

It is concluded that zinc sulfate interferes with physiological role of the endocrine glands which modified in their structure and activity leading to disturbed synthesis and release of neurosecretory material, or may affects the endocrine glands activity in an indirect way. Zinc sulfate may be used as a control agent against *S. littoralis* among other control methods. Salama *et al.* (1985) showed the remarkable effect of zinc sulfate at 0.1% in enhancing the potency of the endotoxin of *Bacillus thurengiensis* Var Kurstaki HD-1 with 16 fold increase. They mentioned the mode of action of the salt may be correlated to its effect on the proteolytic enzymes present in the insect mid-gut. Weiss *et al.* (1982) mentioned that 0.24 mg. of $ZnSO_4$ caused significantly increasing replication of *Autographa californica* nuclear polyhedrosis virus. Funk and Consigli (1992) indicated that Zinc may have critical role in maintaining virus stability.

References

Abbott,W.S.1925.Amethod for computing the effectiveness of an insecticides. J. Econ. Entmol., 18:265-267.

Bendeczky,J.M and F.Sehnal.1980. Ultrastructure study on the innervations of prothoracic gland in *Galleria mellonella.* Endocrynology.4(3):400-407.

Finney,D.J.1971. Probit analysis . (3^{rd} ed; Cambridg. Univ. Press, U. K).

Funk,C.J and R.A.Consigli.1992. Evidence for Zinc binding by two structural proteins of *Plodia interpunctella* granulosis virus.J. Virology,66(5):168-71.

Gullan,P.J; P.S.Cranston.2005. The insects: An outline of entomology(3^{ed}).Oxford: Black Weel Puplishing.61-650.

Ibrahim,A.K.A and D.E.A.Sheble.2002. Biological parameters for evaluating the effect of insect growth regulators against grasshopper, *Euprepocnemis plorans plorans* (Chap.) and cotton leaf worm, *Spodoptera littoralis* (Boisd.) J Agricul.Res. 80(2):571-5810

Mittal,P.K; T. Adak;and V.P. Sharma.1995.Bioeffecacy of six neem (*Azadirachta indica*) products against mosquito larvae.Pesticide.Res.J.7(1):35-37.

Nation,J.L.2002. Insect physiology and biochemistry.CRC Press. 113-455.

Rentakarn, A; A. Macdonald; W. Tomkins; C. David; A. Brownwright and S.R. Palli.1997. Ultrastructure effects of non-steroidal ecdyson agonist, RH-5992, on the 6th instars larvae of the spruce budworm, *Cheristoneure fumiferana* (Bibliographic citation) J. Insect Physiology, 43(1): 55-68.

Riddiford,L.M.1980. Insect endocrinology :Action of hormones at the cellular level. Ann . Rev. Physiol,42: 511-528.

Salama, H.S and A. Sharaby. 1985. Histopathological changes in *Heliothis armigera* infected with *Bacillus thuriniensis* as detected by electron microscopy. Insect. Science. Applic. 6 (4): 503-511.

Salama,H.S;M.S.Foda;and A, Sharaby.1985. Potentiation of some chemicals to increase the effectiveness of *Bacillus thuringiensis* against *Spodoptera littoralis* .Z.Ang.Entmol.100:425-433.

Salama, H.S. and A. Sharaby. 1973. Effect of Zinc sulphate on the feeding and growth of *Spodoptera littoralis* (Boisd.).Z.ang.Entmol.72.(1972/73):383-389.

Sastry,K.S; R.R.Muth and P.S.Sarma .1958. Studies on the Zinc toxicity in the larvae of the rice moth *Coryca cephalonica* Biochem.J. 69, 425-428.

Schluter, U. 1985.Disturbance of epidermal and fat body tissue after feeding azadirachtin and its consequence on larval moulting in the Mexican bean beetle, *Epilachna varivestis* (Col. Coccinellidae) Ent. Ger. 10:97-110.

Sell, D.K. and C.V.Schmidt.1968.Chelating agents suppress pupation of the cabbage looper. J. Econ. Entomol. 61: 946-9490

Sell, D.K. and D.A. Bodznick.1971. Effect of dietary $ZnSO_4$ on the growth and feeding of tobacco bud worm, *Heliothis virscens* . Ann.America. Entomol. Soc. 64: 850-855.

Sharaby,A.1987. Screening of certain inorganic salts as possible sterilants against the lesser cotton leaf worm , *Spodoptera exigua*(HBN.),by pupal treatments.Bull.Ent.Soc.Egypt.16:269-282

Sharaby,A ;F.El-awari and S.A.Ibrahim. 2008. Some inorganic salts for production of sterile adults of the red palm weevil *Rhynchophorus ferruginous* (Coleoptera:Curculionidae). Egypt. Acad.J. biolo. Sci;1(2):205-210.

Sieber, K.P. 1982. Untersuchngen uber die wirkung des Azadirachtin auf die Entwicklung und ihre steuerung bie *Locosta migratoria* Ph.D. Thesis, Univ. of Munich, FRG.

Smagghe, G; H. Salem and D. Degheede.1996. Tebufenuzide effects on nonsteroidal ecdysreroid agonist on cuticle formation in Indian meal moth, *Plodia interpunctella* larvae. (Bibliographic citation).Parasitica.52(4):143-151.