CHAPTER VI
6.1. SUMMARY

The present investigation was carried out under glasshouse conditions to evaluate the efficacy of different organic amendments applied either alone or in combinations with nematicide (Carbofuran/Furadan- 3G) against *Meloidogyne incognita* attacking tomato cv. ‘K25’, eggplant cv. ‘Navkir’, chili cv. ‘Pusa Jawala’ and okra cv. ‘Saimla’.

The organic additives when applied in the form of fresh chopped leaves of some selected plant species including *Azadirachta indica*, *Ricinus communis*, *Tagetes patula*, *Melia azedarach*, *Lantana camara*, *Jatropha panduraefolia*, *Annona squamosa* and *Ficus virens*, at two different doses (50g and 100g/pot). These treatments were highly effective in reducing the population densities of root-knot nematode and root disease caused by *M. incognita* in tomato cv. ‘K25’, eggplant cv. ‘Navkir’, chili cv. ‘Pusa Jawala’ and okra cv. ‘Saimla’. However, the efficacy of the chopped plant leaves varied at different time intervals. The decomposed plant leaves were found more efficacious as compared to undecomposed leaves of the same plants. The reduction in the root-knot development brought about simultaneous enhancement in the plant growth characters of the test crops. Among various treatments, a chopped leaf of *A. indica* was found highly effective and *F. virens* was least effective.

The aqueous dilutions of leaf extract of above selected plant species were found deleterious to root-knot nematode juveniles (*J_2*) *in vitro* test. The
percent mortality of nematodes increased with an increase in the concentrations of aqueous dilution and exposure period. There was a linear relationship between mortality of *M. incognita* and concentration of aqueous dilutions of leaf extracts. The juveniles emergence and penetration in roots of tested plants were also retarded by these aqueous dilutions. The aqueous dilutions were tested at two different conditions viz., undecomposed and decomposed against *M. incognita*. When compared among the treatments, the decomposed aqueous dilutions of leaf extract of all test plants were found more toxic to nematodes as compared to undecomposed aqueous dilutions of leaf extract of same test plants.

Soil amendment with fresh floral parts, decomposed fruits, bark and leaves of *A. indica* and *M. azedarach*, and fresh floral parts and fresh flowers, decomposed fruits, aerial stem and leaves of *L. camara* and *J. panduraefolia* were found also effective in reducing root-knot development caused by *M. incognita* and their population in soil, and improvement in plant growth parameters of tomato cv. ‘K25’, eggplant cv. ‘Navkiran’, chili cv. ‘Pusa Jawala’ and okra cv. ‘Saimla’. Among all treatments, the combined applications of plant parts/products along with carbofuran were more efficacious as compared to single treatment of plant parts/products against *M. incognita*. In case of plant parts/products of *L. camara* and *J. panduraefolia*, the treated decomposed aerial stem with carbofuran were most powerful in reducing root-knot disease and nematode population. Among plant parts/products of four test plants viz., *A. indica*, *M. azedarach*, *L. camara* and
A similar study was also undertaken to explore the efficacy of oil cakes of some selected plants (neem, castor, groundnut and mustard) and a nematicide (carbofuran) alone and in combination with carbofuran against *M. incognita* under glasshouse conditions. The combined applications of oil cakes with nematicide were found more effective in reducing root knot disease severity caused by *M. incognita*. These oil cakes showed highly antagonistic effect on nematode but combined treatment of neem oil cake with carbofuran was found most efficacious against *M. incognita*. *In vitro* test, aqueous dilutions of oil cake extract of neem, castor, groundnut and mustard were also found highly toxic to juveniles of *M. incognita*. Moreover, the decomposed aqueous dilutions of oil cake extracts of above mentioned plants were more deleterious to juveniles (*J*2) than undecomposed aqueous dilutions of oil cake extracts. The toxicity of decomposed neem oil cake was found maximum against nematodes. However, the aqueous dilution of undecomposed mustard oil cake was found least effective against *M. incognita*.

The organic additives which include plant products like Achook (a neem based triterpene rich product of Godrej Agrovet Ltd.), Econeem (a neem product of Margo Biocontrols Pvt. Ltd., India) and oils of neem, castor and groundnut were used as urea coating agents for controlling the important root-knot nematode, *M. incognita*. The treatment of Achook was found more
efficacious against *M. incognita* as compared to other test treatments. The enhancement of plant growth of susceptible cultivars of tomato, eggplant, chili and okra had positive correlation with the degree of nematode control. The different oils also proved to be highly efficacious against *M. incognita*.

The bare-root dip treatment of tomato, eggplant and chili seedlings with aqueous dilution of undecomposed as well as decomposed oil cakes and leaves extracts of *A. indica* and *R. communis* provided protection against root-knot nematode, *M. incognita*. A curative effect was also noted when roots of pre-infected seedlings were given a similar treatment. The suppression of root-knot development was greater in pre-infected seedlings as compared to those inoculated after the dip treatment. Here again, the decomposed leaves and oil cakes were more effective in comparison to the undecomposed treatments and the *A. indica* extracts were more promising than that of *R. communis* extracts. The reduction in the root-knot development brought about simultaneous enhancement in the plant growth characters of all the test crops. The effects of oil cakes were comparatively better than leaves.

The aqueous dilutions of selected plant species viz., *A. indica*, *R. communis*, *T. patula*, *M. azedarach*, *L. camara*, *J. panduraefolia*, *A. squamosa* and *F. virens* were tested *in vitro* for their antinemic action against *M. incognita*. Decomposed aqueous dilutions of leaf extract were more deleterious to nematodes than undecomposed aqueous dilutions. The percent mortality of *M. incognita* increased with an increase in the concentration of dilutions of leaf extract and exposure period. Similar trend was also noted with respect to
inhibition in juveniles hatching of *M. incognita*. Here again increase in concentration increased the inhibition in hatching. The flowers and fruits of some plants viz., *A. indica*, *M. azedarach*, *L. camara* and *J. panduraefolia* were also used against the root-knot nematode, *M. incognita* under *in vitro* experiment. The aqueous dilutions of fruit extracts were more effective against nematode as compared to flower extracts. All these aqueous dilutions also arrested the hatching of *M. incognita* significantly.