SUMMARY AND CONCLUSION

Brinjal (*Solanum melongena* L.) Commonly known as eggplant, is a popular and principal vegetable crop. It is highly productive and finds its place as the poor man’s crop. Brinjal is important for its high nutritive value. This important food crop is affected by several diseases like *Fusarium* wilt, Damping off, Leaf spot, *Phomopsis* fruit rot. Amongst them *Fusarium* wilt caused by *Fusarium oxysporum* and *Phomopsis* fruit rot caused by *Phomopsis vexans* were observed in severe form. The information available on these diseases as well as pathogens is very scanty. Hence, it demanded an early investigation into various aspects of the pathogen and also the disease.

Based on the results obtained during the present investigation, the following conclusions may be drawn.

* A fixed plot survey was conducted during 2011-2013 in Goalpara, Dhubri, Barpeta and Kamrup (rural) to know the incidence of fungal diseases viz. *Fusarium* wilt, Leaf spot and *Phomopsis* fruit rot occurring on three different varieties of brinjal in farmers fields. The PDI of wilt disease ranged from 23.6 to 31.1 percent. Least percent incidence was noticed at Dhubri district (23.6%) and highest incidence (31.1%) was observed at Kamrup (rural) district. Besides wilt, leaf spot was noticed 20.6 to 22.1 percent. Highest incidence appeared in Dhubri district (22.1%) while lowest incidence was noticed in Kamrup (rural) district (20.6%). The *Phomopsis* fruit rot incidence varied from 30.3 to 32.1 percent. Maximum disease incidence was observed in Goalpara (32.1%) and minimum appeared in Dhubri (30.3%).

* Six fungal pathogens were isolated from infected parts of brinjal plant by following standard tissue isolation method. On the basis of morphological and cultural studies the pathogens were identified as *Alternaria melongenae*, *Aspergillus flavus*, *A. niger*, *Curvularia lunata*, *Fusarium oxysporum* and *Phomopsis vexans*. Out of them *P. vexans* and *F. oxysporum* developed the maximum numbers of colonies, while *A. flavus* developed the minimum number of colonies.

* All the isolated fungal pathogens were pathogenic. Artificial inoculation of *A. melongenae*, *A. flavus*, *A. niger* and *C. lunata* into brinjal leaf which produced similar symptoms 30 days after inoculation. Inoculation of *Fusarium oxysporum* on healthy brinjal seedlings developed
symptoms 21 days and when inoculation of *Phomopsis vexans* on healthy brinjal fruit were developed symptoms 10 days after inoculation.

* Among the six isolated, two pathogens viz. *Fusarium oxysporum* and *Phomopsis vexans* were found most devastating pathogens that attack brinjal plant in every field condition.

* Thereafter *in vitro* and *in vivo* control measures were carried out by using plant extracts, microfungi and fungicides against these two important diseases.

* Among the eight plant extracts studied in *in vitro* *Allium sativum* (84.6% inhibition) was found most effective in inhibiting the mycelial growth of *Fusarium oxysporum* f.sp.*melongenae* followed by *Allamanda cathertica* (70.2%). On the other hand *A. sativum* showed 100 percent inhibition the mycelial growth of *Phomopsis vexans* followed by *A.cathertica* (80.9%) inhibition.

* The result of dual culture technique revealed that *Trichoderma viride* was found to be more effective than *T.harzianum*. Maximum reduction in colony growth was observed in *T.viride*; which was very effective when compared to *T.harzianum* against both the tested pathogens i.e. *Fusarium oxysporum* f.sp.*melongenae* and *Phomopsis vexans*.

* Five fungicides were tested *in vitro* against *Fusarium oxysporum* and *Phomopsis vexans*. Among them Carbendazim was found to be highly effective in inhibiting the mycelial growth of *F.oxysporum* in all the three concentrations (0.1, 0.15 and 0.2) percent; the next effective treatment was Mancozeb which recorded 83.4 percent inhibition at 0.2% concentration. Subsequently, among the fungicides tested against *Phomopsis vexans* Carbendazim showed 100 percent inhibition of mycelial growth in all the three concentrations i.e. (0.1, .15 and 0.2)% followed by Captan 85.2 percent inhibition at the highest concentration (0.2%).

* Among the various treatments studied *in vivo* in pot experiment, wilt disease was completely absent in the treatments of T3, T4 and T5 i.e. Soil and root treatment with Carbendazim, Mancozeb and *T.viride* respectively in all the three varieties. Next best treatments were *Allium sativum* (T6) and *Allamanda cathertica* (T7) in terms of reducing the disease.
* While *in vivo* studies under natural fields condition revealed that Maximum control of wilt disease was observed in treatment of T$_3$ i.e. Soil treatment and Root treatment with Carbendazim @ .1% followed by T$_5$ i.e. Soil and Root treatments with *T. viride* in all the three varieties. However, though the two treatments of botanical extracts were less effective but found significantly superior over control.

* Plant height was also more in the treatment T$_3$ followed by the treatment T$_5$.

* In case of *Phomopsis* fruit rot under natural field condition, minimum disease incidence was recorded in treatment T$_3$ i.e. Seed treatment and foliar spray with Carbendazim @ 0.1% followed by the treatment T$_4$ i.e. of Seed treatment and foliar spray with Captan @ 0.2%.

* Highest yield was also recorded in the treatment of T$_3$ followed by the treatment of T$_4$.

**Conclusion:**

From the present study, it can be concluded that Soil and Root treatment with fungicides, fungal antagonist and botanical extract were most effective in terms of suppression of *Fusarium* wilt disease. On the other hand Seed treatment and foliar Spray with fungicides, fungal antagonist and botanical extracts were found the most efficient treatment in terms of management of *Phomopsis* fruit rot of brinjal. The climatic conditions of other states of North East India do not vary significantly from those of Assam, hence it is expected that it can be effectively used by the farmers of other states as well.

However, investigation for reducing the cost of involvement in chemical application alone should be looked into in future investigation so as to bring the cost of benefit ratio in favour of farmers.

Further these practices should be carried out in the different agro-climatic zones of the state to test their effectiveness in managing the diseases.