CONCLUSION

The present study confirmed to the reports of cannibalism among instars of T. splendens. Cannibalism (probably a survival tactic) is useful in natural system for regulating population of T. splendens. However, the same behavior is a cause of lower yield of the predator in mass-rearing facilities and thereby affects the total number of adults produced. Cannibalism rarely occurred in the laboratory when prey density was maintained at ad-libitum. The ability of fourth instar to starve for prolonged time period is of advantage to the species in natural surroundings, where the food supply is liable to be in shortage on occasions. Also, storing of this species in large number for getting adults in ample supply to be released during the monsoon season is possible. In situations, when the prey density is high, the appreciable reduction in the prey number due to predation especially when the predator number is less will not be attained. In such situations, the predator's compulsive killing of prey individuals may help in the reduction of the prey number. Since, prey constitutes vector mosquitoes, further reduction in the prey number is considered desirable. Results indicate that in rearing facilities more number of males to female is necessary to enhance the chances of the female meeting the male thereby increasing the rate of insemination. Both males and females will be fit for mating only when they are more than 48 hr. old. These points should be taken in to account while mass-rearing the species for field release of adults to control container breeding mosquitoes. Since, females of majority of the mosquito species are blood feeders, estimation of relative population is possible by conventional methods such as bait collection, resting collection and trap collection etc. Conversely,
females of T. splendens are not blood feeders and their ecology in nature is poorly understood. The only feasible method to estimate female population of T. splendens is using oviposition traps. In this connection, the informations gathered through the present study such as diurnal oviposition, the preference of females to lay eggs in water containing prey, the preference of black automobile tyres for oviposition will be useful to device ovitraps to capture visiting females for oviposition. In this way, adult population can be estimated. This will enable to study adult dispersal, longevity, fecundity and oviposition habits in nature. Ovipositional overlap between the predator and the target species, which is crucial for the control of target species is ensured by T. splendens by selecting oviposition sites where prey is present.

The results of life table and bioenergetic studies indicate that prey number and size largely affect the population growth of T. splendens. T. splendens seems to have developed different life strategies in response to food availability. The present data indicate that T. splendens increases or decreases its immature duration depending on the availability of the prey thereby maintaining the total feeding above threshold level below which pupation and adult emergence will be drastically affected. Amount of protein present in the diet determines the feeding rate and relative growth rate of the predator. The high protein content of the larvae of An. stephensi makes the processes of conversion of food in to body substances energetically less expensive and elevates RGR of the predator. The data show that male survives little longer than female. My insemination experiment has indicated atleast two male to one female for effective insemination. Hence, longer male survival is construed adaptive to the species. The present laboratory estimates
of survivorship, longevity and fecundity are presumed to depict the genetic potentiality of this species in relation to prey availability. The present study also indicates that the contribution of the individual male and female for the population increase would be directly related to life expectancy at emergence and the number of fertile eggs produced. Highest $R_0$ value of 518.33, obtained by feeding *T. splendens* with 40 third instar of *Ae. aegypti* indicates that net reproductive rate and food level are linearly related. With relatively high potential value of $r_m$ at high prey density, *T. splendens* would be able to exploit favorable conditions and rapidly increase its population size in response to availability of prey. Another adaptive character found in this species is elongating G. In addition, the $r_m/b$ and $b/d$ ratios were low indicating that this species would be considered "r" strategist. Therefore, higher $R_0$ and $r_m$ related to high food level as well as longer adult lifetime at high prey densities give hope for mass-producing this predator at the time of field release to control *Ae. aegypti*. In India, *Ae. aegypti* is found to be a problem during monsoon period. Releasing large number of adults of *T. splendens* at the time of onset of monsoon is possible by offering large number of larvae of *An. stephensi* to the predator. Since, the generation time is considerably reduced by shortening of immature duration, high feeding rate and high RGR, more number of adults can be produced in the laboratory. Such an active feeding during the larval development helps in storing more nutrients and energy to tide-over the non-feeding pupal and comparatively less active feeding adult periods besides increasing the fecundity and survival of the adult. Conversely, during other periods of the year, *T. splendens* can be maintained in less number by offering them less prey. By this way the major difficulty of rearing
the prey in large number to feed the larvae of *T. splendens* continuously throughout the year can be solved and is cost effective.

The results of frequency dependent prey selection and functional response of instars of *T. splendens* indicate that all instars of *T. splendens* prefer small size prey in their diet though the degree of heavy reliance on the small size prey decreases with increase in predator size. The advantage of attacking second instar of *Ae. aegypti* when they are in large number is that energy spent by the predator in capturing and subduing the prey will be less when compare to energy spent in handling large size prey. Furthermore, in order to attain its minimum energy requirement, the predator has to subdue more number of second instar of prey species to attain its energy requirements thereby reducing to a considerable extent the number of prey to developing to adults. However, the decrease in intraspecific competition as a result of decrease in prey density should be taken in to account if one wants to gauge the extent of success in the control of *Ae. aegypti* by *T. splendens*. This may depend on how efficiently the predator reduces the prey number in unit of time. This requires further field investigation to ascertain the level of reduction in adult emergence of the target species due to predation in comparison to what will be the case when there is no predation. The results indicate that instars of *T. splendens* search for prey actively though they are basically ambush predators. The results provide informations that will simplify modelling predation of mixed age populations of the predator.

Data of prey behavior in response to predation risk show that whereas, *Ae. aegypti* responded to predator precisely (predation rate and *Ae. aegypti* movement were negatively correlated), *An. stephensi* and *Qx. quinquefasciatus* responded to predator per se (no significant -ve correlation between predation rate and prey movement). This
information is useful for understanding both the adaptiveness of the responses and the effects of the responses on the dynamics of the predator-prey interactions.

From the data of predator-prey population interaction studies, it is inferred that initial predator number as well as structural complexity in the breeding habitats support continuous interaction of prey and predator populations for the desirable time period and which is considered crucial for the success of control of *Ae. aegypti* population by *T. splendens*.

Field experiments demonstrated that weekly introduction of just one predator to containers was sufficient to reduce the adult emergence of *Ae. aegypti* from discarded tyres in tyre dumping yards and is considered feasible and economical. The results of field studies suggest the existence of habitat overlapping of both *T. splendens* and its prey species. Both the predator and prey prefers to breed in the tyre habitat. This suggests that tyre habitats are more complex owing to the larger surface area and the presence of fallen plant leaves and dry plant sticks. Hence, the automobile tyres are considered as more suitable devices to be used as ovitraps in the study of population dynamics of both the predator and prey as well as their dispersal. Further, the present study suggests that if the disease transmission potential is high, vector population may be reduced initially by the judicial application of insecticides and then further reduction can be accomplished by the field release of *T. splendens*. A protocol on adult release experiments to investigate the impact of the predation on abundance of adult prey population, adult dispersal, longevity, fecundity and oviposition habits of *T. splendens* in nature is under preparation. It is hoped that these studies will provide information to find out why greater control of target species was not achieved.