5. DISCUSSION

5.1. Population incidence of *Coelophora saucia* (Mulsant) and its prey, *A. craccivora* Koch on two cultivated Fabaceous crops

Studies on the population dynamics of the coccinellid predator, *C. saucia* and the prey aphid, *A. craccivora* on two Fabaceous crops over a period of two years revealed that the incidence pattern of *A. craccivora* is governed directly or indirectly by the predator, *C. saucia* in the field. Dixon (1985) also opined that a cumulative effect of two or more factors and in certain cases even the effect of one become responsible for the fluctuation of aphid population. Population studies of *A. craccivora* on *V. unguiculata* (cowpea) revealed appearance of the pest on young shoots of the crop in April in both the cropping seasons. Although initial density of the prey aphid was low, the peak activity on the crop was recorded particularly in June. More or less similar period of activity of *A. craccivora* have been reported by several workers (Hijam and Singh, 1989; Singh, 2002; Patel et al., 2010). However in the present study the predator, *C. saucia* appeared on the crop, *V. unguiculata* in late May and was active in the field till July in both the years of observation. The population density of the predator species closely followed the population trend of its prey aphid. The peak
activity of *C. saucia* was recorded in June in both the years and coincided with the peak period of *A. craccivora* population.

On the second crop, *D. lablab* (country bean) infestation of *A. craccivora* on young shoots of the host plant started in 3\textsuperscript{rd} and 4\textsuperscript{th} week of September in 2009-2010 and 2010 – 2011 respectively. However, the coccinellid *C. saucia* exhibited its activity on the crop during November in 2009-10 and October in 2010-11. It was also observed that population of the predator increased proportionately in the field with the increase in prey population. The peak activity of both the prey and predator was observed during the 1\textsuperscript{st} week of December in 2009-10 and 4\textsuperscript{th} week of November in 2010-11. Similar density dependent relationships between population of aphids and coccinellids in different agro-ecosystems have been reported by several workers (Singh *et al*., 1995; Narang and Rana, 1999; Singh and Rai, 2000; Jalali *et al*., 2000; Devi *et al*., 2002, Bilashini and Singh, 2011).

Banerjee and Bandyopadhyay (2005) concluded that the specificity of peak period of the same aphid species vary according to the crop as observed in the present study. More or less similar activity of coccinellids and their prey have been reported by Singh (2002) in Manipur. Hijam and Singh (1989) reported that the incidence of prey and predator on *V. unguiculata* at two study sites extended from April to August with peak activity during last week of May and 2\textsuperscript{nd} week of July. Lokeshwari and
Singh (2008) reported the peak activity of both *A. craccivora* and *C. sexmaculata* beetles on country bean during December and January. Although most of the coccinellids and aphid species are generally observed throughout the year, their peak density was observed during a specific period as evident in other predator and prey species such as *C. septempunctata* and *L. erysimi* (Singh and Singh, 2004; Bilashini and Singh, 2011; Lokeshwari et al., 2012), *C. sexmaculata* on *A. gossypii* and *A. craccivora* (Parsana et al., 1997; Lokeshwari and Singh, 2008), *C. transversalis* and *A. craccivora* (Agarwala and Bardhanroy, 1999) and *H. dimidiata* on *C. quercus* and *T. nervatus* (Sharmila et al., 2007, 2010).

Arrival of *C. saucia* on both the crops after ten to twelve fold increase in aphid density may be attributed to several factors. Coccinellids are known to require minimum prey density to oviposit (Seagraves, 2009) and they tend to oviposit near dense aphid colonies laying more eggs when more aphid prey is available (Hodek and Honek, 1996). In addition, Rosenheim et al. (1995) implied a partitioning of food resource in time and space depending upon size of the predators.

Correlation analysis between prey and predator revealed a significant positive relation in both the years and crops taken under study. Significant positive correlation between coccinellids and prey corroborates with the earlier finding of Singh and Singh (2000, 2002), Jalali et al. (2000), Afroze
(2001), Lokeshwari and Singh (2008) and Bilashini and Singh (2011). This relationship implies that as the prey population increased in the field, the abundance of the predator also increased.

Weather conditions prevailing in a region generally plays an important role in occurrence and subsequent build-up of insect population in each habitat. Correlation analysis of the prey and predator with abiotic factors for cowpea (V. unguiculata) revealed that the prey exhibited insignificant positive correlation with average temperature and insignificant negative correlation with relative humidity, total rainfall, windspeed and sunshine. The predator also exhibited weak insignificant correlation with the abiotic factors. Diraviam and Viraktamath (1991), Singh and Singh (2000, 2002), Veeravel and Jagnathan (2002), Nonita et al. (2002) had also reported positive correlation of prey and predator with average temperature.

Correlation co-efficient analysis of both prey and predator with abiotic factors for country-bean (D. lablab) revealed negative relation with all the abiotic factors except sunshine in both the years. In the first cropping season, average temperature and relative humidity were observed to exert significant negative effect on the population of the predator. Parsana et al. (1997), Jalali et al. (2000), Dhaliwal and Singh (2004), Paul and Konar (2005), Banerjee and Bandyopadhyay (2005) also reported negative correlation of predator and prey with temperature. Lokeshwari and Singh
(2008) had reported similar result for *A. craccivora* aphid infesting country bean. The differences observed in the correlation co-efficient values of abiotic factors with prey and predator for the two crops in the present study may be due to difference in the cropping period as well as prevailing environmental factors.

Negative correlation of relative humidity with prey and predator population had also been reported by Tank and Korat (2007), Lokeshwari and Singh (2008), Hasan *et al.* (2009) and Lokeshwari *et al.* (2010b). Rainfall was found to have a detrimental effect in the population build up of aphids. Similar results have also been reported by Atwal *et al.* (1971), Roy (1975), Saharia (1980), Sharma *et al.* (1997), Veeravel and Jagnathan (2002) and Singh and Singh (2002). But Banerjee and Bandyopadhyay (2005) reported rainfall to be positively correlated with aphid population. In certain cases, rainfall and sunshine hours were considered less effective regarding development of predator population (Paul and Konar, 2005). Although there are various reports indicating the quantitative relationship between aphid population, predator density and various abiotic factors, no definite pattern has been recorded probably due to the agro-ecological differences existing in different places where investigations were carried out (Chandra and Kushwaha, 1986; Yadav and Singh, 1992-93).
Keeping in view the above association, stepwise multiple regression models was worked out between weather parameters and aphid and predator population. Regression analysis revealed that the combined effect of both aphid population (biotic) and abiotic factors could cause about 64 – 82.5% variation of *C. saucia* population. Yadav and Singh (1992-93) recorded that the combined effect of temperature and relative humidity on the coccinellid population ranged from 47.3% - 81.5% (on rapeseed crop) depending on life-stage. The present findings also corroborates with that of Jalali *et al.* (2000) except in some respects. Meanwhile, Parihar *et al.* (2001) opined that weather factors together were able to explain the variation to the extent of 92.6% on potato crop. Schmidt *et al.* (2003) also recorded that flying predators including coccinellids were responsible for lowering of cereal aphid population by 70%. Further, Sarma *et al.* (2007) reported that multiple regression analysis of five natural enemies of *C. lanigera* showed 89% relationship with aphid population. Singh *et al.* (2008) also reported that *C. septempunctata* could effectively reduce aphid population by 88.17%.
5.2.1. Functional response of *C. saucia* larvae

The functional response of a natural enemy offers a good conceptual framework for understanding the action of agents in inundative releases (Waage and Greathead, 1988). The results in the present study revealed that consumption of aphids by *C. saucia* larvae during its development at different prey densities increased with increase in aphid density while the proportion of prey eaten declined at high densities of prey which is a characteristic of type II functional response (Pervez and Omkar, 2005). *C. saucia* thus exhibited Type II predatory response in relation to increasing prey densities as described by Holling (1959). A type II functional response with a decelerating predation rate has the potential to destabilize prey-predator population dynamics due to an inverse density-dependent mortality of the prey (Hassell, 1978). Most coccinellids predators show Type II response as reported in *C. sexmaculata* (Bind, 1998; Agarwala et al., 2001; Lokeshwari et al., 2007), *C. transversalis* (Omkar and James, 2001; Sarker et al., 2008), *C. septempunctata* (Omkar and Srivastava, 2003a; Bilashini et al., 2006), *H. axyridis* (Lee and Kang, 2004), *P. dissecta* (Omkar and Pervez, 2004), *H. variegata* (Farhadi et al., 2010), *S. syriacus* (Sabaghi et al., 2011), *A. cardoni* (Omkar and Kumar, 2013), *C. propingua, C. lunata* and *C. sulphurea* (Mrosso et al., 2013). Such response is typical of predators foraging in unstable prey populations and this means rapid
utilization of food by predators even at lower densities. The increased prey consumption with increase in prey density may possibly be ascribed to the simultaneous occurrence of several phenomena such as rate of searching, duration of prey exposure, handling time, hunger level of the predator and nature of experimental arena (O’Neil and Stimac, 1988).

Satiation reduces the feeding performance of the beetles and was not achieved at initial prey densities as exhibited by high percent prey consumption. The remnants of the prey were scarce when predator was exposed to prey at lower densities which suggested that satiation was not achieved. Whereas prey encounters were more frequent at higher prey densities and predator continued to feed till satiation or beyond. The predator after attaining satiation did not devour the prey completely and ate only the soft portion leaving the hard body surfaces. The tendency of the predator to increase prey mortality even after attaining satiation seems to be highly supportive to a sustainable biocontrol programme. Hodek and Honek (1996) have also concluded that hungry ladybeetles completely devour the first few prey individuals they encounter and utilize the subsequent prey individuals with gradually reduced predatory drive.
5.2.2. Larval developmental duration

A substantial influence of varying prey density viz., 5, 15, 30, 45, 60 and 80 on the rate of larval development was recorded in the present study. Duration of all life stages except first instar was prolonged at lower prey densities. As the least developmental duration was observed at prey density of 60 individuals, this density is considered to be optimum for its growth and development. In general, total larval period and pupal period were observed to decrease from low to high density. Phoofolo et al. (2008) also reported that decreasing food consumption rates increased developmental time and slowed larval growth. The findings are also in conformity with those recorded on several ladybeetles viz., *H. axyridis* (Hukusima and Ohwaki, 1972), *P. japonica* (Kawauchi, 1979), *C. septempunctata* (Bilashini et al., 2006), *C. sexmaculata* (Lokeshwari et al., 2010a), *H. dimidiata* (Sharmila et al., 2010a) and *C. maculata* (Santos-Cividanes et al., 2011).

Larval development could also be completed at the least prey density of 5 prey aphids. This may be ascribed to the fact that predaceous coccinellids show a pronounced ability to adjust to food scarcity as an adaptation to intermittent absence of prey.
5.2.3. Weight and relative growth rate

Several workers have reported an increase in weight and survival of the predator with increasing prey availability (Hukusima and Ohwaki, 1972; Kawauchi, 1979; Devi et al., 2007). Results of the present investigation revealed relative increase in the average weight of different instars of *C. saucia* with increase in prey density. The highest weight was observed at the prey density of 60 aphids/150cm$^2$/day. Weight of third and fourth instars was found to be significantly different at different prey densities than the early instars. This might be due to the fact that early larval instars consumed less amount of prey whereas the later stages exhibit a higher intake of food because of their requirement of more energy for future growth, development and reproduction. Similar inferences were drawn by Ponsonby and Copland (2000), Isikber and Copland (2001) and Omkar et al. (2005).

Larval growth rates of *C. saucia* increased with increase in prey density and upper asymptote was recorded at 60 aphid density. The present findings are in close agreement with Devi et al. (2007). Their study revealed that at high prey density growth rate of larvae was higher. The probable reason for such behavior of the predator could be due to the combined effect of higher food ingestion by larva and subsequently faster developmental time. Omkar and Srivastava (2003c) opined that the RGR of a ladybeetle larva was found to be proportionate to the amount of food
eaten. An increase in availability of food and temperature has also been reported to result in an increase in growth rate measured as increase in weight per unit weight per unit time (Dixon, 2000).

5.2.4. Food conversion efficiency

Of the food eaten by the ladybird larvae, a part is egested as faeces and the rest is assimilated. Of the total energy contained in the assimilated matter only a part is converted to body tissues, utilized as reserves or exhausted during egg production. The rest is lost as metabolic costs of food conversion and respiration (Hodek and Honek, 1996).

The food conversion efficiency of the larva into body mass was found to be highest at lowest prey density and decreases thereafter. Least conversion efficiency of the larva was observed at the density of 45 aphids/150 cm² which was at par with the conversion efficiency of the larvae reared at 30, 60 and 80 aphids/150 cm². Schuder et al. (2004) and Devi et al. (2007) had also reported conversion efficiency of larvae of *A. bipunctata* and *C. transversalis* to be maximum at the lower prey density.

5.2.5. Searching efficiency and prey handling time

The searching efficiency or the area of discovery of *C. saucia* larvae decreased from 4.269 to 0.856 with increase in prey density. The decrease in the area of discovery with increase in prey densities may be ascribed to
the fact that with increase in prey densities, the predator switches over from extensive to intensive search, which leads to decrease in the area of discovery. Highest area of discovery at lowest prey density suggests that prey scarcity stimulates the foraging behavior of the ladybeetle and this result is in close agreement with that of Tamaki and Long (1978). Hassell (1992) and Omkar and Pervez (2004) opined that searching is effected by dispersion pattern and aphid density. According to Hassell et al. (1976) the decrease in search time occurs because at higher prey densities prey are more easily found. Similar results were also reported by Ambrose and Calver (1995), Omkar and Srivastava (2003b), Rocha and Redaelli (2004), Hemchandra and Singh (2009) and Bilashini et al. (2010).

Handling time is a good indicator of the predation rate (Athan and Guldal, 2009) and shorter the handling time, the faster the curve reaches the asymptote (Nordlund and Morrison, 1990). Prey handling time of *C. saucia* larvae decreased with increase in prey density. Akhtaruzzaman and Ahmad (1998) reported the handling time of predator to be higher with low foraging rate at lower prey density. Similar inferences on prey handling time were drawn for *C. septempunctata* (Omkar and Srivatava, 2003a), *P. dissecta* (Omkar and Pervez, 2004) and *H. eucharis* (Hemchandra and Singh, 2009).
5.3.1. Age and size of adult at maturity

Most organisms mature earlier in general as growth conditions or food supply improve (Gotthard and Nylin, 1995). Present study reveals that females kept under low food environment required longer time to mature eggs and such females are at a disadvantage while searching for food and are likely to produce fewer eggs. Similar results were earlier reported by Stearns and Koella (1986). *C. saucia* females that developed at the density of 60 aphids/150 cm$^2$ took minimum duration in attaining maturity. Increased availability and consumption of aphid accelerates maturation of ovarioles and possibly results in short pre-oviposition period (Rhamhalinghan, 1985; Omkar and James, 2004a). The present findings are more or less similar to that of Pervez (2002) wherein decreased consumption resulted in increased pre-oviposition period.

The results of the present study showed that the adult size at maturity increased with increase in prey density. Female beetles of the larvae that developed on low food supply were smaller in size in comparison to beetles of the larvae that developed on high food supply. The finding is in conformity with that of Agarwala *et al.* (2001). Several studies have documented that variable prey availability in time and space could result in the variation in the size of adult predator (Barbult, 1988; Zhou *et al.*, 1995). Differences in adult size affect the fitness of females in terms of mating,
food consumption, fecundity and longevity (Kessler, 1971; Zheng et al., 1993a, 1993b; Ohgushi, 1996; Richardson and Baker, 1997). Size difference in adult females in a competitive environment could be disadvantageous to smaller individuals in terms of lower fecundity and reduced longevity (Agarwala et al., 2001). The difference in prey consumption and fecundity among the female beetles due to difference in size was evident in the present study. Smaller adults consumed lesser food and produced fewer eggs at constant food availability. This indicates the model explained by Hassell (1978), Taylor (1984) and Ferran and Dixon (1993).

5.3.2. Reproductive duration

Results of the present study revealed that prey density had a significant influence on the reproductive duration of the predator. The longest and shortest reproductive period were observed respectively at the density of 60 aphids/150cm² and 15 aphids/150cm². High rate of consumption at optimum density probably reduced the duration of ovariole maturation and provided the energy to increase the oviposition period. Whereas, reduced consumption at lower prey densities adversely affected the development of ovarioles. Honek (1980) observed that a certain amount of food is necessary for maturation of ovarioles and this may be a probable reason why the female beetles reared at 5 aphid density failed to oviposit.
Earlier studies also concluded that food has a profound effect on the oviposition period (Agarwala et al., 1988; Agarwala and Choudhuri, 1995; Omkar and Pervez, 2003a; Omkar and Bind, 2004 and Sharmila et al., 2009). Thus it can be concluded that consumption of optimum amount of prey enhanced the reproductive phase while inadequate food consumption increased the non-reproductive phase.

5.3.3. Adult longevity

Longevity of adult *C. saucia* females were found to be affected by the quantity of prey available for predation. Maximum longevity was recorded at the prey density of 60 aphids/individual/150cm$^2$ while shortest duration/longevity was observed at 5 aphid density. This might be attributed to higher prey consumption by the beetles at optimum prey density. Similar results have also been reported by Rogers *et al.* (1972), Milevoj (1997), Babu (1999), Devi *et al.* (2007) and Sharmila *et al.* (2009).

5.4.4. Aphid consumption and functional response

Consumption rate of *C. saucia* adult females increased with increase in prey density thereby exemplifying type II predatory response described by Holling (1959). A gradual progressive increase in consumption from low to higher prey densities with upper asymptote at 60 aphid density was observed. A number of similar studies have demonstrated similar effects of
prey quantity on the consumption, survival and reproduction of aphidophagous predators (Smith, 1965; Evans and Youssff, 1992; Ives et al., 1993; Yasuda and Ishikawa, 1999; Agarwala et al., 2001). Increase in prey consumption at higher densities is limited by satiation (Mills, 1982) and hence the consumption at 80 aphid density was found to be significantly lower than the upper asymptote. Further, if a comparison be made between the prey consumption of the beetles during pre-reproductive, reproductive and post-reproductive period, it was found that consumption during pre-reproductive and reproductive period was relatively higher. This could be ascribed to the higher nutrients requirements for egg production and oviposition (Rhamhalinghan, 1987; Omkar and James, 2001).

5.3.5. Fecundity and Hatching success

The fecundity of *C. saucia* females increased curvilinearly with prey density and reached a plateau at higher aphid density of 60 aphids/150cm². The rapid and significant increase in egg production at lower densities with a gradual decline at higher densities may be ascribed to satiation of the nutrient requirements for egg production. Other constraints such as limitation of females to lay not more than certain amount of eggs possibly explain the attainment of plateau at high prey densities. Similar findings were recorded in *C. sexmaculata* (Agarwala and Bardhanroy, 1997), *P. dissecta* (Omkar and Pervez, 2004) and *S. syriacus* (Sabaghi et al., 2011).
The curvilinear function of prey density dependent oviposition can be compared with type II functional response of the predator. This also reveals a prominent saturation level in prey consumption and egg production at optimal prey density. The increased reproductive numerical response (fecundity) at high prey density may also be considered as a strong adaptive strategy to promote its progeny. This finding appears to be in agreement with those of Hemptinne et al. (1992), Yasuda and Katsuhiro (1997) and Agarwala and Bardhanroy (1999). Further, it was observed that females reared at the density of 5 aphids/ day failed to oviposit. Similar result had also been reported by Ives (1981a, b) and this may be due to very low rate of aphid consumption. Osawa (2005) also recorded decreased egg laying and increased incidence of oosorption in _H. axyridis_ in relation to temporary food restriction.

The percent viability of eggs of _C. saucia_ was observed to be highly influenced by the amount of aphid prey provided. Consumption of an adequate amount of prey increased the viability of eggs. Hence an increase in percentage of hatching with increase in prey density offered was observed with maximum hatching at 60 aphid density. Similar findings have also been reported in _C. transversalis_ (Devi et al., 2007) and _H. dimidiata_ (Sharmila et al., 2009). Simmons (1988) suggested that greater amount of consumption of preferred prey increases the weight of the eggs
which contains a large quantity of yolk and consequently increase egg hatching.

5.3.6. Fecundity schedule

Egg production declined with age and reached the lowest prior to death. The decline in egg production mirrored the decline in aphid consumption. The study suggested that the efficiency with which *C. saucia* females acquire and process food deteriorate with age and is largely responsible for the triangular shape of the fecundity schedule. This is consistent with the expectation that selection is likely to favour those individuals that invest more in early reproduction (Boggs, 1986; Dixon and Agarwala, 2002). Omkar and Mishra (2005) opined that young females appear to be more efficient in converting the aphid biomass into eggs than the older ones. Reproduction output in most insects, including ladybirds, starts and reaches a maximum early in adult life and then declines (Dixon, 2000). The fecundity of *C. saucia* females at varying prey density was found to be maximum for the first 20 days and declined thereafter. Similar results have also been reported in *C. montrouzieri* (Jalali et al., 1999), *C. septempunctata* (Srivastava and Omkar, 2004) and *P. dissecta* (Pervez et al., 2004; Mishra and Omkar, 2004).
5.3.7. Reproduction efficiency

The results of the present study shows that proportion of prey eaten and the ratio of number of eggs produced to number of prey eaten by *C. saucia* females were maximum at lower prey densities i.e., 15 aphids density and this was significantly higher than the proportion achieved at the prey density of 60 aphids.

The metabolic pool model states that only a part of the energy derived from the prey biomass is converted into egg production and the rest is lost as metabolic costs of food conversion and respiration to maintain life (Baumgartner *et al.*, 1987). Present result indicates that female ladybeetles at low prey density probably allocate most of their energy in egg production and in the process invest less in maintenance and metabolic activities. The decreased ECI at higher prey densities possibly suggest that well-fed females laid large number of eggs, besides investing much in maintenance and metabolic costs. The findings are in conformity with that of Agarwala *et al.* (2001), Omkar and Pervez (2004), Devi *et al.* (2007), Sabaghi *et al.* (2011) and Omkar and Kumar (2013).

5.4. Intraguild interactions

Cannibalism and intraguild predation are the most common trophic interactions observed in predatory insects, especially ladybirds (Yasuda *et
al., 2001; Burgio et al., 2002). These interactions may either stabilize prey-predator populations (Godfray and Pacala, 1992) or adversely affect foraging, larval growth, and development as well as reproductive attributes of individual predator (Hemptinne et al., 1992; Ruzicka, 2002; Agarwala et al., 2003a; Mishra and Omkar, 2006; Rieder et al., 2008).

In the present investigation, developmental duration of C. saucia larvae was found to be prolonged both in the treatment with conspecific and heterospecific predators even at surplus aphid food supply. It may be ascribed to the fact that the foraging behaviour of the predator may change in presence of intraguild predators thereby influencing its development (Johansson, 1993a, b; Schimtz et al., 1997). It was found that growth rate of C. saucia larvae was affected significantly in treatments with conspecific and heterospecific predators. The present result is in conformity with that of Kajita et al. (2000) in the context of the interactive relationship of A. bipunctata with other conspecific and heterospecific larvae on high prey abundance. Sharmila et al. (2011) had also reported more or less similar result on development and weight gain of H. dimidiata larvae in treatments with conspecific and heterospecific larvae.

Results on the effect of intraguild interactions on oviposition suggest that fecundity of adult C. saucia female was significantly affected by both conspecific and heterospecific predators. Agarwala et al. (2003a) reported
that *C. sexmaculata* females responded to the presence of conspecific as well as heterospecific predatory adults by reducing egg laying but not competing for aphid prey. Soares and Serpa (2007) also recorded that *H. axyridis* caused a decrease in *C. undecimpunctata* fecundity even when extraguild prey was abundant. Similar results on decreased fecundity in presence of conspecific and heterospecific predators have also been reported by Veeravel and Baskaran (1997), Mishra and Omkar (2006), Alhmedi *et al.* (2010) and Sharmila *et al.* (2011).

The hatching success of eggs laid by *C. saucia* female in different treatments with conspecific and heterospecific predators was found to be significantly different. Maximum hatchability was recorded in control. Mishra and Omkar (2006) and Sharmila *et al.* (2011) had also reported more or less similar results.

The nature and relative strengths of the interactions between ladybird species differ in relation to prey abundance and species involved. Results on the studies on cannibalism and intraguild predation (IGP) revealed that *C. saucia* fourth instar larvae and adult female exhibited both cannibalism and IGP. Also it was evident from the result that as the number of prey supplied increased, incidence of both cannibalism and predation of eggs and larvae decreased. Increased predation and cannibalism during prey scarcity may be ascribed to high pressure for insect survival and development. Agarwala
(1991) attributed lower cannibalism of eggs at higher aphid density to decline in chances of encountering eggs as aphid density increased. Several authors have also reported the intensity of cannibalism and IGP to be significantly influenced by the presence or absence of extraguild prey (Agarwala and Dixon, 1992; Meyhofer, 2001; Burgio et al., 2005; Cottrell, 2005). In larval-larval interaction it was observed that in the presence of abundant prey, neither cannibalism nor predation occurred. More or less similar result has been reported by Rondoni et al. (2012). This was possibly due to (i) low mobility of well fed larvae resulting in low encounter (Dixon, 2000); (ii) a faster rate of growth of the intraguild prey (Lucas, 2005) and (iii) increase in food selectivity as aphids are qualitatively better and may be less risky in terms of being attacked and eaten compared to intraguild prey (Montserrat et al., 2006). Further the adult female of C. saucia was found to prefer cannibalism over IGP whereas, fourth instar C. saucia larvae was found to consume both conspecific and heterospecific larvae without showing a preference for either species. This finding agrees with observations of Agarwala and Dixon (1992), Omkar et al. (2005b) and Santi et al. (2003).