4. Discussion

Prey density influenced the predation of *P.pseudoannulata* and *V.lineata*, either in single or under competition condition. Total number of prey consumed increased along with the increasing prey density (Figure 1), as also shown in study on predatory hoverfly done by Putra *et al* (2006). This corresponded to the spending time in searching and handling the prey (Maloney *et al* 2003). At low prey density, time was spent to search the prey and a fewer time was used for handling prey, and vice versa. According to Jervis & Kidd (1996), the predation was tended to increase on higher prey density and it would be reduced on low prey density.

Figure 1 also showed the higher ability of *P.pseudoannulata* to prey on *N.lugens* than *V.lineata*. The same pattern was also shown by the percent of predation where it was higher in *P.pseudoannulata* as well as the body weight (Figure 3). This result assumed that the ability of *P.pseudoannulata* to suppress *N.lugens* was higher in the field. Meanwhile, Figure 2 also showed that the percent of consumed reduced along with the higher prey density, although the total number of prey consumed increased.

V.lineata seems to gain more benefit than *P.pseudoannulata* in the increment of prey density as shown by Figure 3.The body weight of *P.pseudoannulata* decreased at prey density of 40 where it exactly increased in *V.lineata*. This result explained that there was a decrement in the ability of predation due to competition between *P.pseudoannulata* and *V.lineata*. The biological nature of predator species might determine the outcome of this competition, i.e. body weight and size, aggressiveness and voracity (Edgar 1970, Wise 1995, Maloney *et al* 2003). In this study, the body weight of *P.pseudoannulata* was 0.017 g which was heavier than *V.lineata* (0.010 g).

Moreover, Figure 4 showed that *V.lineata* was superior against *P.pseudoannulata* when they were competing for obtaining prey, particularly at density of 40. During the test, *P.pseudoannulata* tended to avoid the interaction with *V.lineata and V.lineata* did not indicate an effort to attack P.pseudoannulata physically. It means both predators did not make its competitors as a target for the predation. Foelix (1982) stated that the spiders usually avoid the interaction with the insects that used chemicals for self-defense. Meanwhile Amir (2002) reported *V.lineata* is the insect that has ability to produce the fierce-smelling yellow compound when disturbed.

Even though *P.pseudoannulata* was not known as webs builder but Craig (1997) cit Craig *et al* (1999) reported that all spiders could produce the silk for many purposes, including providing shelter, protection for eggs and tools for prey capture. In this treatment of competition without prey, *P.pseudoannulata* more actively build the webs in horizontal position and randomly upward stratified, while *V.lineata* survived on permanent position at the top. The result showed that there was no found the *P.pseudoannulata* dead in the plastic cup but was found *V.lineata* dead at the webs. Spider web enabled *P.pseudoannulata* to restrict *V.lineata* movement and to trap *V.lineata. V.lineata* was defeated on defense strategies during the competition without prey.

When there were high populations of prey, the predators did not require much time and energy to search and to hunt the prey. *P.pseudoannulata* only needed time to capture and to handle the prey without having to build the webs. The absence of trap were beneficial to *V.lineata*, it created more space to search and to hunt, so that the predation increased. The crossing between two predators without webs also easily occurred that promoted *V.lineata* releasing the fierce-smelling which was not favored by *P.pseudoannulata*. This caused *P.pseudoannulata* to be recessive. When the prey population was higher, *P.pseudoannulata* would build the trap less, the pressure of *V.lineata* on *P.pseudoannulata* would also greater and the predation would be higher.

5. Conclusions

Competition between two predators would reduce the predation and their activities in disrupting existence of competitors, so the pressure toward the prey was reduced. Although both of them are generalist predators but their biological nature such as body weight and size, aggressiveness and voracity would affected the interaction patterns. In addition, the outcome of this experiment showed the negative potencies of predator competition might reduce their potency of suppression on insect pests.

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