

Potential Predator and Parasitoid Local to Pests Control of Maize Stem Borer in Gorontalo Province

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ABSTRACT. Corn borer is one of the important pests on corn in Gorontalo province. Studies on natural enemies (parasitoids and predators) of this pest in Gorontalo province has not been much studied. For the study of the potential of local natural enemies need to be done. The purpose of this study is to see what kind of diversity, composition, level parasitism, and predation. Data collection using the survey method in three districts in Gorontalo Province and data were analyzed using the Shannon index. The results obtained for the type of local parasitoids were found to consist of the order Diptera, Tachinidae family, order Hymenoptera, Ichneumonidae family, and the order Hymenoptera, Chalcididae family, the composition of the predator 52 tails in Gorontalo districts; parasitoid 70 tails in Boalemo districts and 89 tails parasitoid in Pohuwato district. Furthermore parasitism rate of 53.3 % is higher than the level of predation that is only 3.3%. One factor that supports the abundance of natural enemies is the existing vegetation surrounding the corn crop.

Keywords: corn borer, natural enemies

Introduction

Corn is one of the agricultural commodities are expected to tackle the food crisis, and will support national food security by placing corn as a second crop after rice. Corn is a source of food, feed and industrial raw materials.

In an effort to improve corn production in the province of Gorontalo, it should be noted the presence of pests and diseases that can affect the production of corn. One of the pests that often and quite important is corn borer *Ostrinia furnacalis* Guenee (*O. furnacalis* Guenee), and the pink stem borer *Sesamia inferens* (*S. inferens*).

O. furnacalis are common in Southeast Asia, Central Asia, EastAsia, and Australia. In China area these pests are major pest on corn and other crops (Zhou *et al.* 2005). In Indonesia *O. furnacalis* is one of the major pests in cropping maize (Nonci 2004). In addition to pest Gorontalo *O. furnacalis* also found the pink stem borer *Sesamia inferens* (Lihawa *et al.* 2010). In 2003, widespread stem borer pests of corn in the province of Gorontalo reached 1085 ha and 10 hapuso (Herman 2007). Moreover due to stem borer attack has caused physical damage, nutrient disorders and affects the movement of water and nutrients in the plant (Anonymous 2006; Capinera 2008; Sandra *et al.* 2010).

Based on the above conditions, the study of local predators and parasitoids as potential biological control agent of maize stem borer needs to be done, it would be

safe for the environment, human and crop production (corn). Biological control by used of predators and parasitoids is one of the cultivation technology taht environmentally friendly, especially to support export-oriented “zero pesticide”.

Materials and Methods

The method used is a survey method, that is to see the diversity, composition and abundance of predators and parasitoids stem borer in three districts (Gorontalo, Boalemo and Pohuwato) in 2011. Observation plots in each district area of 2,500 m², divided into three sub-plot size of 3 m x 3 m and several plants each plot about 45 plants with corn plant spacing of 75 cm x 25 cm.

Exploration/collection of natural enemies and corn borer (eggs, larvae, and pupae) in each plot 3 m x 3 m area of 9 m², identification of natural enemies (predators and parasitoids), for the potential parasitism collected 30 corn borer from each plot.

Data were analyzed by descriptive and organized into tables, to the diversity and composition using the Shannon Index (Wratten and Fry 1980),

$$H = - \sum \frac{N_i}{N} \log \frac{N_i}{N}$$

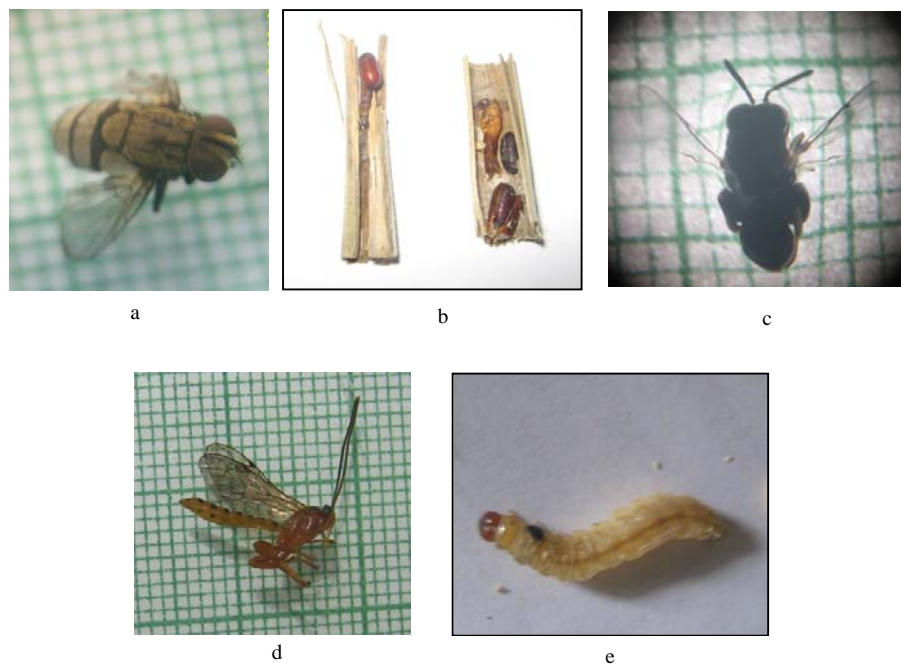
Results and Discussion

The results of the exploration of natural enemies of maize crop in three locations in the district (Gorontalo, Boalemo, and Pohuwato), obtained from the predatory natural enemies, namely the Order Coleoptera, Family Coccinellidae, Staphylinidae, Carabidae; Order Araneae, Family Lycosidae, Salticidae, Tetragnatidae, and order Dermaptera with every small population. Also in corn planting can also be found predators such as *H. octomaculata*, *Micraspis* sp., *M. sexmaculatus*, *M. crocea*, *Crysopa* sp., and *Orius* sp., that could potentially suppress populations of *O. furnacalis* (Nonci 2004; Koch *et al.* 2006). But the natural enemies of the parasitoids were found are of the order Diptera, Tachinidae family, order Hymenoptera, Ichneumonidae family and Chalcididae.

Furthermore Dutton (2003) and Losey (2004), reported that in Western Europe one parasitoid potentially regulate and control the maize stem borer *O. nubilalis* parasitoid *Erioborus terebrans*. Parasitoid was included in the Order Hymenoptera Family Ichneumonidae. Parasitoids attacking larvae *Erioborus terebrans* *O. nubilalis* that are in non-transgenic corn plants.

The composition of the population of natural enemies (predators and parasitoids) shows that for Gorontalo regency is the most natural enemies of the predator are 52 individuals, while the parasitoid are three individuals. Pohuwato district was and is the most natural enemies of the parasitoid, respectively for Boalemo district some 70 individuals, Pohuwato 89 individuals, while the predator to the district Boalemo about 43 individuals, and 57 individuals in Pohuwato.

Many parasitoids obtained are of the order Diptera, Tachinidae family, last instar parasitoid larvae and pupae corn borer, rate of about 50% parasitism Boalemo district, and the district Pohuwato parasitism level around 53%, while in the Gorontalo regency Tachinidae parasitoids are not found. Corn borer parasitoids found in Gorontalo regency was of the order hymenoptera family Ichneumonidae parasitism rate 6.7%, and the family Chalcididae parasitism rate of around 3.3%. While the predatoris found was of the order Aranea and Dermaptera the predation rate is about 3.3%. For detail sthe following picture (Figure 1) the local parasitoid and its parasitism level (Figure 2).



Description:

- a) last instar parasitoid larvae and pupae Maize Stem Borer found in the district. Boalemo and districts. Pohuwato (order Diptera; family Tachinidae)
- b) Pupa Tachinidae
- c) and (d) Maize stem borer parasitoids (hymenoptera order, Family Chalcididae and family Ichneumonidae) found in Gorontalo regency
- e) *Ostrinia furnacalis* larvae are parasitoids Ichneumonidae parasitized

Figure 1. Maize stem borer local parasitoids were found in Gorontalo

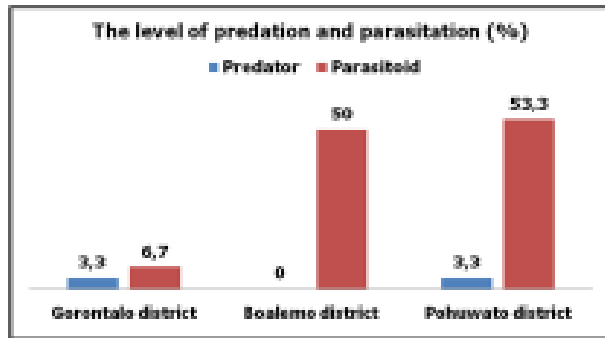


Figure 2. Parasitism and predation levels % of local natural enemies in Gorontalo.

Based on this, the parasitoid of the order Diptera, Tachinidae family more potential to reduce several population of *O. furnacalis* in the next planting season, and is quite effective for along time, but for the parasitoid eggs have not been found.

Furthermore, the diversity of natural enemies in Gorontalo regency and district Boalemo including category, it can be seen from many individuals found only about (55-115) individuals. While the district Pohuwato diversity of natural enemies were high, as the number of individuals found that a lot more about (143) individuals. The diversity of natural enemies in three research illustrates many species/individuals from natural enemies found. The abundance of natural enemies in the district Pohuwato could be supported by the existing vegetation surrounding the corn crop.

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