

# The Introduction of Predatory Bird *Lanius Schach* from Yogyakarta to Salibabu Island for Controlling *Sexava* Spp. On Coconut Palm

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Diterima 9 Mei 2014 / Direvisi 25 Agustus 2014 / Disetujui 27 Oktober 2014

## ABSTRACT

The chronic, endemic, and outbreak of a longhorn grasshopper (*Sexava* spp.) occurs at central production of coconut palms in Indonesia, such as North Sulawesi, Maluku, North Maluku, Papua and West Papua. Farmers suffer from very significant economic-losses due to the pest attack, for example in Salibabu Island. Previous study in 2010 at District of Bolaang Mongondow Selatan, Province of North Sulawesi, revealed that the predatory bird *Lanius schach* is promising for biological control of the pest. In areas of the pest outbreak, the bird is absent, on the other hand, it is abundant in Yogyakarta. As many as 30 males and 10 females of the bird were introduced to Salibabu Island and they were intended to control the pest. All birds were successfully introduced and released at Sub District of Moronge. Within 2 months after release the birds were observed at 5 km away from the release site. Trends on reduction of the pest population-density and leaf damage were observed within 2 months after predator release. Next program on acceleration of the predator increase in numbers is urgently attempted to keep the predator being under controlled within expected period of 3 years.

*Keywords: Introduction, coconut palm, Sexava, Lanius schach, biological control.*

## ABSTRAK

### *Introduksi Burung Predator Lanius schach dari Yogyakarta ke Pulau Salibabu untuk Pengendalian Sexava Spp. pada Tanaman Kelapa*

Ledakan populasi belalang antena panjang (*Sexava* spp.) yang kronis dan endemik terjadi pada sentra produksi kelapa di Indonesia, seperti Sulawesi Utara, Maluku, Maluku Utara, Papua dan Papua Barat. Serangan hama ini mengakibatkan petani mengalami kerugian ekonomi yang sangat signifikan, misalnya serangan di Pulau Salibabu. Penelitian awal pada tahun 2010 di Kabupaten Bolaang Mongondow Selatan, Provinsi Sulawesi Utara, mengungkapkan bahwa predator burung *Lanius schach* berpeluang sebagai agens pengendalian hayati hama tersebut. Di daerah ledakan populasi hama, burung ini tidak ada, tetapi, burung tersebut berlimpah di Yogyakarta. Sebanyak 30 jantan dan 10 betina burung berhasil diintroduksi ke Pulau Salibabu. Untuk mengendalikan hama tersebut, predator burung *Lanius schach* telah diintroduksi sebanyak 30 ekor jantan dan 30 ekor betina ke Pulau Salibabu. Predator yang berhasil diintroduksi ini dilepas di Kecamatan Moronge. Dua bulan setelah pelepasan, burung dapat diamati pada jarak 5 km dari lokasi pelepasan. Kepadatan populasi hama dan kerusakan daun cenderung menurun dalam waktu 2 bulan setelah pelepasan predator. Program berikutnya adalah percepatan peningkatan jumlah predator dan diusahakan supaya predator dapat diawasi dalam jangka waktu sekitar 3 tahun.

*Kata kunci: Introduksi, tanaman kelapa, Sexava, Lanius schach, pengendalian hayati.*

## INTRODUCTION

Coconut palm is one of the important commodities in Indonesia. In 2008 the crop area was reported approximately 3.8 million hectares, at which, 98% out of the areas belong to farmers (Syakir, 2008).

Approximately 67% of North Sulawesi export in 2010 was based on coconut-palm product especially coconut-palm flour (Industry and Trade Extension Service of North Sulawesi, 2010).

Significant yield loss of the coconut-palm products is due to attack of the longhorn grasshopper (*Sexava* spp.) (Orthoptera: Tettigoniidae). *Sexava* spp.

was known as one of the major pest that caused serious damage on coconut palms in Eastern of Indonesia (Hosang and Laba, 2008; Hosang *et al.*, 2010). *Sexava* spp. was distributed locally in North Sulawesi, Maluku, North Maluku, Papua and West Papua. It is more than 8 decades the pest insect being chronic, endemic, and explosive, in those areas especially in North Sulawesi (Kalshoven, 1981). Up to now the pest is still being a significant constrain in the production of coconut palm. In 2008 North Sulawesi, suffered from an estimated loss of 5,992,812 ton of copra, equivalent to 26.360 billion rupiahs (Estate Crop Extension Service of North Sulawesi, 2008). Several efforts of *Sexava* control have been done, but most of it only focused on using of synthetic systemic insecticide by trunk injection (Hosang and Laba, 2008; Hosang *et al.*, 2010). There are some problems on using insecticide continuously for a long period, will be harmful to environmental. Therefore eco-friendly control against *Sexava* spp. has been suggested by using *Sexava* traps (Hosang and Alouw, 2010). The biological control were effective, efficient, and sustainable measurement control that urgently to be developed to keep the pest being under controlled.

Locust pest in Mauritius was successfully controlled in 1762 by introducing Mynah bird (*Acridotheres tristis* L.) from India. The Mynah bird was also successfully to control another grasshopper i.e. *Nomadacris septemfasciata* (De Bach, 1974). A field experiment in Mauritius revealed that a predatory bird *Lanius* sp. was able to reduce population of second instar of locust from approximately 190.000 to less than 500 individuals within 10 days and for fourth instar from 180.000 to 5000 individuals within 4 days (Wilps *et al.*, 1996). Those experiences inspired us to develop local predatory bird for controlling the longhorn grasshopper in North Sulawesi.

Under laboratory conditions, *Lanius schach* preyed second instar, fourth instar, and adult of *Locusta migratoria manilensis* (Orthoptera: Acrididae) at rate of 124 individuals/45 minutes, 29 individuals/215 minutes, and 12 individuals/137 minutes; respectively (Astuti; 2008). This finding indicates that *L. schach* has high potency for controlling the locust. According to Lala *et al.* (2013) grasshoppers (Orthoptera) was the most preferred prey by *L. schach*. Feeding rate of *L. schach* is also shown on the longhorn grasshopper. Lala (2010) did experiment on functional response of the bird against the longhorn grasshopper (*Sexava coriacea*) in Bolaang Mongondow Selatan, North Sulawesi. According to Lala *et al.* (2013) grasshoppers (Orthoptera) was the most preferred prey by *L. Schach*. Under conditions of screen cages, feeding rates of *L. schach* on young nymphs, old nymphs, male adult, and female adult of the longhorn grasshopper were 10,4 individuals/71,4 minutes,

5,4 individuals/53,7 minutes, 2,4 individuals/95,1 minutes, and 2,4 individuals/102 minutes; respectively. This finding also revealed that *L. schach* is the potential predatory-bird against the longhorn grasshopper. According to Lala *et al.* (2010), biological activity of long-tailed shrike (*L. Schach*) between 06.00 AM to 18.00 PM consists of hunting and feeding prey (16.52%), fly (6.53%), jump (5.70%), and runs (4.58%), while in the evening silence and sleep.

The *L. schach* is abundantly available at market and naturally in its habitat at Gunung Kidul, Yogyakarta. Meanwhile, the bird species is not reported to exist in North Sulawesi (Sukmantoro, *et al.*, 2007). Therefore, it is eligible to introduce *L. schach* from Yogyakarta to North Sulawesi. Salibabu Island, District of Kepulauan Talaud, was preferred as a release sites because of highly outbreak of the pest insect and it is not a big island, hence, it may support the successfulness of the predator introduction.

## MATERIALS AND METHODS

The introduction was conducted in May until November 2011. The introduction procedures comprised of several steps: legal and formal documents, collecting and packing of bird, shipping, socialization of program, predator release, and evaluation.

Due to the avian flu disease is still under strictly supervision, the bird introduction must follow the given regulations. Legal and formal of the following five documents for the bird introduction must be fulfilled. 1). Letter of permission to move the animal or wildlife from one area to another area in Indonesia. 2). Bird health certificate for *L. schach* issued by veterinarians in Yogyakarta. 3). Letter of recommendation on introduction of livestock, livestock-product, or livestock byproduct from the area of destination. 4). Letter of recommendation on expenditure of livestock, livestock-product, or livestock byproduct from destination area from the area of origin. 5). Animal Health Certificate from Quarantine.

In order to support the success of the introduction of predatory birds in Salibabu Islands, the local farmers and other stakeholders who will benefit were expected to support. For this intention, socialization on the program of biological control of longhorn grasshopper by introduction of predatory bird *L. schach* was conducted in Melonguane. The meeting was attended by officers at District of Kepulauan Talaud, head of sub districts, head of villages, and representatives of farmers.

The bird was collected from markets in Yogyakarta city and from collectors in Gunung Kidul,

Yogyakarta. Ten females and 30 males of bird were selected with the following criteria. The birds are approximately 9 months old, have slick and glossy feathers, when standing the body get upright, not wild, feed on crickets, larvae of *Tenebrio molitor* and artificial feed, and healthy and fit. Prior to be delivered, the birds were treated with vitamin to keep them in fresh, fit, and health during delivery until release. A vitamin at rate of 0.1-0.2 cc was injected to a single cricket, then it was fed on a single bird. The birds were sensitive to get stress when they brought to the new habitat, hence, they fed with more crickets than usual, 15-30 crickets/day. A single bird was kept in an aerated cardboard-box with 20 cm x 10 cm x 8 cm in size. Every of 20 boxes were packed in a big cage. The cages were then plastered with a sticker of **Animal Health Certificate** by the Agency for Agricultural Quarantine.

The birds-delivery route was from Yogyakarta, Surabaya, Makasar, Manado, Melonguane, and Moronge. It took 5 - 6 hours by plane From Yogyakarta to Manado. The birds transited in Manado for one night. Each bird was taken out from packed-box then it was cultured in a bamboo-frame cage and supplied with drink water, artificial diet, and crickets. It took 45-60 minutes by plane from Manado to Melonguane. It took 30 minutes by speedboat from Melonguane to Salibabu Island. Eventually from the port of Lirung to Moronge Sub District it tooks 15 minutes by car.

Prior to release in Sub District of Moronge, the birds were allowed to acclimatization during 15 days in a well aerated and big room. They were individually cultured in a bamboo-frame cage and supplied with enough number of longhorn grasshopper. Release of the 40 predatory-birds was conducted in August 16<sup>th</sup>, 2011 at four selected villages in the Sub District of Moronge, 10 birds/village. The release was performed in the afternoon. The bird was allowed to get out and fly by itself from an opened box.

Evaluation on the success of predator introduction was aimed at fitness, mortality, and impact of the predator release on reduction rates of pest population and leaf damage. As many as 120 samples of coconut palms were taken at random in Sub District of Moronge. Population density of longhorn grasshopper was observed in situ, while defoliation was determined in the laboratory

## RESULTS AND DISCUSSION

With good preparation and good preservation during transport as well, 100% out of 40 birds were alive until they were ready to be released. During acclimatization, the birds were voraciously feeding on

the longhorn grasshoppers, five to nine grasshoppers were preyed by a single birds per day (Lala, 2010). Figure 1 illustrates the feeding habit of the bird.

Due to the birds have already been benign, it was not wildly to fly out when they were released. Some flew away and perched on coconut midrib. Several ones just get out shortly and jumped on the ground for a while. Eventually, all of them spread out in the garden and plantation of coconut palms. It was about 3 hours after release, their chirp sounds were noisy audible.

Evaluation of the predator introduction showed that the predator was well established. The predatory birds were released in August 2011 then in November 2011 (within 3 months after release), the predators were found in Sub District of Lirung, approximately 5 km away from the release position in Sub District of Moronge. Local community heard birds' voice in this area. It indicates that the introduced birds adapted well in the new habitat and we do hope they are able to reproduce.



Figure 1. The predatory bird *Lanius schach* feeding on nymph of longhorn grasshopper (*Sexava* spp.)

Gambar 1. Burung predator *Lanius schach* sedang makan nimfa belalang antena panjang (*Sexava* spp.)

Introduction of the predatory birds showed the impact on the pest control in Sub District of Moronge, Talaud Island (Figure 2). Lower population density of the pest and defoliation rates were observed in months after release than before release. Trends in reduction of pest population and plant damage indicate performance of the predator in controlling the pest. Decline in the pest population will continue to be more and more decline as the predator being well established and reproduce. The successful introduction of predators in suppressing and regulating pest populations is determined by several factors. Those factors are efficiency in colonization,

Figure 2. Average population-density of longhorn grasshopper (*Sexava* spp.) and leaf damage of coconut palm in Sub District of Moronge at Salibabu Island, before and after release of the predatory birds *Lanius* sp.

Gambar 2. Rata-rata kepadatan populasi belalang antena panjang (*Sexava* spp.) dan kerusakan daun tanaman kelapa di Kecamatan Moronge di Pulau Salibabu, sebelum dan sesudah pelepasan burung predator *Lanius* sp.

functional response, numerical response, aggregation to the highest pest-population, and switching to more available prey when shortage of main prey (Wagiman, 1996).

Biological control by introduction of predators needs relative long time. This release is called as inoculative release because it was only a little number of predator to be released, 30 males and 10 females. The birds need several years to make new generations that are enough to suppress and regulate the pest population toward being under control. Referred to prior experience in controlling scale insect *Aspidiotus destructor* on coconut palm by introduction of predatory coccinellid *Chilocorus politus* (Wagiman, 2006), it is expected that within 3 years a head the outbreak of longhorn grasshopper in Salibabu Island will be under controlled.

To ensure the survival of the predatory birds, the birds are protected from attempts to catch by people who are not responsible. For that, the local security of Salibabu Island was requested to help for protecting the birds from hunters. Commitment of local governments to support this introduction program are very good. Local government intends to issue regulations regarding the protection of useful animals including the predatory bird, *L. schach*.

## CONCLUSION

1. The predatory bird *L. schach* was successfully introduced from Yogyakarta to the Salibabu island. The impact of the predator release on the control of

longhorn grasshopper (*Sexava* spp.) was showed by trends in reduction of the population density of the pest and defoliation rates.

2. Acceleration in the predator numbers is urgently needed to cope the problem of the pest outbreak toward being under control and it is expected during approximately 3 years.

## ACKNOWLEDGEMENTS

The research was funded by a partnership between the Agency for Agricultural Research and Development Headquarters in Jakarta and Institute for Research and Community Services Universitas Gadjah Mada with the Letter Agreement Implementation Activities Number: 911/Lb.620/I.1/3/2011 dated March 21, 2011. Gratitude and high appreciation presented to the Faculty of Agriculture Universitas Gadjah Mada, Research Center for Management of Biological Resources Universitas Gadjah Mada, the Local Government of Kabupaten Kepulauan Talaud, which have facilitated the study, and all those who have helped.

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