

Assessment on prevention of invasion of *Prostephanus truncatus* (Horn) (Coleoptera: Bostrichidae) in Hainan province, China

Wei Xu¹, Ye Qixian¹, Guan Lianghua² and Zhang Shengfang³

Abstract

Large grain borer (*Prostephanus truncatus* (Horn)) is a major pest of farm-stored maize and dried cassava. It is listed to be the quarantine pest of China. Under the optimum condition of temperature (27–32°C) and relative humidity (70–80% r.h.), *P. truncatus* has the potential to spread still further into Hainan Island from abroad, for, being a tropical region, Hainan also produces maize and cassava. According to the outbreak conditions of this pest, we made an assessment on invasion of this pest to Hainan Island and found: It is possible for the beetle to spread into Hainan Island and subsequently spread into the inland of China if quarantine measures would not be taken.

Introduction

Prostephanus truncatus (HORN) attacks before harvest and continues to do so throughout storage (Quintana et al., 1960). It has principally been recorded in Central American countries, but it has been found in California, Texas and the District of Columbia. In South America, it was recorded only from Brazil. In Tanzania, farm-stored maize and cassava are subject to very severe infestation by the introduced large grain borer. Outside the American continent, it has been observed attacking stored maize in China, and was found in products of Chinese origin at an exposition held in Paris (Lesne, 1898). But there is no evidence to suggest that it has become an established pest in China (Back and Cotton, 1922; Kulash, 1954). According to the optimum condition of temperature (27–32°C) and relative humidity (r.h. 70–80%) and farm-stored grain (maize and cassava) of this pest, we made an investigation in Hainan Island. Firstly, to determine whether the

temperature and humidity in Hainan are instrumental to this pest's distribution. Secondly, to assess the possibility of this pest's infestation in maize and cassava in Hainan. Thirdly, to assess its potential for becoming an established pest in Hainan. Fourthly, to assess the potential of its subsequently further spread into the inland of China. For these purposes, we concluded an assessment on prevention of invasion of the beetle.

Investigation

Temperature and humidity

According to the local meteorological records, the average temperature is between 27–32°C in April, May, June, July, August and the first half month of September in Hainan. Obviously, the temperature in Hainan is adaptive to the survival and development period of the beetle. As to the relative humidity, it is recorded that the relative humidity, it is recorded that the relative humidity annually is between r.h. 80–85%. Thus, it is a little higher than the suitable relative humidity (r.h. 70–80%). As a hot humid tropical area, Hainan province takes the risk of being established by this large grain borer. Once this pest is spread into the area, temperature/humidity conditions will help this pest's distribution.

Maize and cassava

Farm-stored maize and cassava in eastern Africa are subject to very severe infestation by the introduced beetle in 1984. Through it is hot and dry in eastern Africa, the traditional storage methods assist in the establishment of this pest. In eastern Africa, farmers store maize cobs with husk intact and keep them in the lofts of houses or on racks or platforms in the sun. In Hainan Island, maize is mainly used as breeding and then transported into the inland of northern China. Even though a small quantity of maize with husk intact is kept in Hainan, they are only young maize cobs sold as snacks, or small part of them are stored as feed. The acreage of maize in Hainan is about 260,000 mu, and its annual produced quantity is 46,000 tons, and it is planted mainly in Sanya, Lingshui, Qiongzong and Ledong. Compared with maize, cassava cultivated and stored is very

¹ Hainan Animal and Plant Quarantine Service, Hainan 570311, China

² Tianjin Animal and Plant Quarantine Service, Tianjin 300191, China

³ Laboratory of Entomology, Institute of Plant Quarantine, Agriculture Ministry, Beijing 100029, China

popular in Hainan, and its acreage is 500,000 mu, and its annual produced quantity is 485,000 tons. It is distributed in most of the cities and counties, mainly in Tunchang and Qionghuan. The produced cassava is mainly used as forage and starch. Also, some cassava slices are imported from Thailand since 1988. But the large grain borer has never been intercepted by quarantine. There is no record that the beetle has ever infested cassava and maize in Hainan. The investigation results presented here clearly demonstrate that *P. truncatus* has not been spread into Hainan Island, but once it is spread into this tropical area, the losses can not be estimated.

Discussion

Hainan Island, which covers an area of 34,000 square km and has a population of 6.6 million, became a province and was designated as a special economic zone in 1988. Since then, it has been making efforts to improve infrastructure facilities and investment environment to attract more foreign businessmen. Especially in Agriculture, over 200 Taiwan entrepreneurs have invested in tropical and high efficacious agriculture. The products have been exported to many countries and also to inland of China. So, import and export quarantine is very important. Three measures can be taken as follows: Firstly, in the course of quarantine, pay more attention to the maize, rice, cassava, bean which are imported from the South America, Central America, countries and Eastern Africa areas. And other wooden packing parts should also be strictly inspected. Secondly, to reduce the possibility of infestation by the large grain borer and other insects, fumigation treatment should be taken prior to storage of the grain. Thirdly, as a southern breeding base of China, Hainan plays an important role in providing the fine varieties of plants into other provinces, municipalities and autonomous regions. In order to prevent the possible invasion of the large grain borer from abroad into Hainan and subsequently into the inland of China, passenger and cargo ships and planes from Hainan to inland of China should be strictly quarantined. Otherwise, once the large grain borer is further spread through Hainan into the inland of China, the damage to the Agriculture of our country will be hardly estimated. We also have the responsibilities not to make Hainan 'The Bridge Tower' of the large grain borer to China.

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