

Survey on occurrence and damage of banana weevils in Hainan province, China

Jiong Yin¹, Yu-Jie Wang², Jing-Lin Gao³ and Dong-Xiang Zhao^{4*}

¹⁻⁴ Environment and Plant Protection Institute, Chinese Academy of Tropical Agricultural Sciences, Haikou 571101, Hainan Province, P.R. China

*Email: dongxiang_zhao@163.com

Odoiporus longicollis Oliver and *Cosmopolites sordidus* Germar are important pests for damaging bananas in China (Zhang, 1999). *Polytus mellerborgi*, a native of Indo-Malaya, has become widely spread by commerce and is now present over much of the tropical world where bananas are grown from southeastern Polynesia through Melanesia, Micronesia, Indo-Malaya, south China, Burma, India, Ceylon, islands of the Indian Ocean to Madagascar, etc. (Zimmerman, 1968).

The aim of this scientific note is to inform and alert about the geographical spread of banana weevils, which are important pests of bananas in Hainan Province, China. Particularly, our main goals were to identify a new record species and to determine its current distribution.

A survey for the presence of banana weevils was conducted in 11 cities (counties) in Hainan Province from May 2008 to December 2009. Levels of infestations and banana damages were evaluated in about 5 plots per site. The incidences of infestations were determined by visual symptoms of stalk boring (n = 30 plants/plot) and dissecting leaf sheaths outside stalks for identifying and counting the adults based on occurrence level from Lu *et al.* (2002). Most specimens are deposited in Environment

How to cite this article:

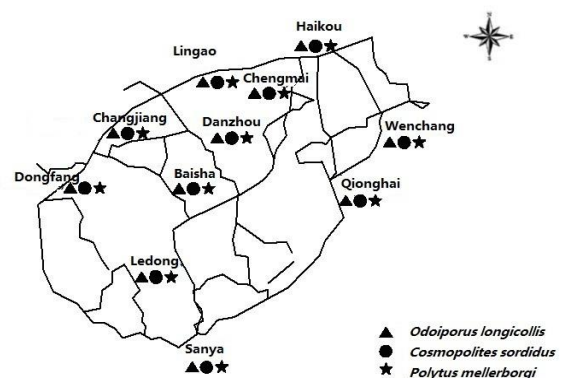
Jiong Yin, Yu-Jie Wang, Jing-Lin Gao and Dong-Xiang Zhao (2015). Survey on occurrence and damage of banana weevils in Hainan province, China. *Biolife*, 3(3), pp 662-664. doi:10.17812/blj.2015.3314

Published online: 22 July 2015

and Plant Protection Institute, Chinese Tropical Agricultural Sciences.

O. longicollis, *C. sordidus* and *P. mellerborgi* were all found in commercial banana fields in Hainan Province (Figure-1 and Figure-2). *O. longicollis* occurred mainly in Ledong,

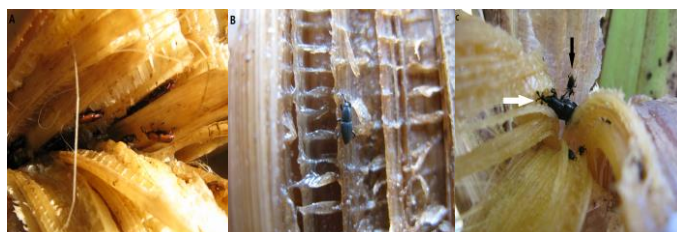
Figure-1. Current distribution map of banana weevils in Hainan Province



Changjiang and Lingao. There are significant occurrence differences in various areas (Table 1). The survey showed that all stages of *O. longicollis* with overlapping generations (4-6 generations for one year) were found in Hainan Province, and male/female ratio was 0.97. Adults aggregated around the cuts of broken banana stalks in most cases, and the number of *O. longicollis* was calculated up to 68 weevils per stalk. Surprisingly, we found that about 82 *O. longicollis* lived in a fresh banana stalk fell

down on the ground. For another, the damage of *C. sordidus* commonly distributed in Qionghai and Baisha (Table 1). It was observed in the course of the survey that a number of *C. sordidus* damaged a banana stalk, including 21 adults, 57 larvae and 35 pupae. The last but not least, *P. mellerborgi* spread in Haikou, Changjiang and Wenchang (Figure-1). The pest aggregated in the middle or the lower parts, even roots of banana stalks. Red and black individual adults coexisted in the field, and they mated both daytime and night.

Figure-2. Three species of banana weevils
A: *Odoiporus longicollis* Oliver;
B: *Cosmopolites sordidus* Germar;
C: *Cosmopolites sordidus* Germar (white arrow), *Polytus mellerborgi* Boheman (black arrow)



It is thought that the occurrence differences of *O. longicollis* in various fields depend on aggregated distribution of adults and banana species (Lu *et al.*, 2001). We speculated that *C. sordidus* aggregates together in terms of volatiles from banana stalks and aggregation

pheromone (Tinzaara *et al.*, 2003, 2005, 2007).

P. mellerborgi is smaller compared with *O. longicollis* and *C. sordidus*. *P. mellerborgi* is a high vitality species and coexists with other banana weevils despite the fact that the damage of the pest is not serious. The presence of *P. mellerborgi* in China has been reported by Zimmerman (1968). However, to the best of our knowledge, this is the first report of *P. mellerborgi* in Hainan Province, China.

Acknowledgements:

We thank Prof. Runzhi Zhang of Institute of Zoology, Chinese Academy of Sciences and Dr. Junhao Huang of Zhejiang A & F University for their help in identifying specimens. This study was financially supported by National Key Technology Research and Development Program of the Ministry of Science and Technology of China (2007BAD48B05-01) and National Nonprofit Institute Research Grant of CATAS-EPPRI (2008hzs1J008).

References:

1. Lu, Y.Y., Liang, G.W. and Zeng, L. (2001). Spatial pattern of *Odoiporus longicollis* adult. *Chinese J. Trop. Crop.*, 22(3), 29-33. (in Chinese)
2. Lu, Y.Y., Liang, G.W. and Zeng, L. (2002). Resistance index of banana varieties to banana pseudostem weevil, *Odoiporus*

Table 1. Occurrence and damage of banana weevils in Hainan Province

Sites	<i>O. longicollis</i> (weevils/plant)	<i>C. sordidus</i> (weevils/plant)	<i>P. mellerborgi</i> (weevils/plant)
Baisha	0.86 ± 0.15 ab A	2.07 ± 0.29 d B	0.47 ± 0.19 ab
Danzhou	7.40 ± 1.40 f E	3.92 ± 0.75 e C	0.60 ± 0.17 b
Chengmai	2.80 ± 0.72 cd BC	3.40 ± 0.88 e C	0.27 ± 0.15 ab
Sanya	2.00 ± 0.37 bc ABC	1.93 ± 0.60 d B	0.13 ± 0.09 ab
Lingao	1.54 ± 0.23 abc AB	0.34 ± 0.09 a A	0.03 ± 0.02 a
Haikou	1.28 ± 0.15 ab AB	0.34 ± 0.10 a A	0.40 ± 0.13 ab
Wenchang	0.49 ± 0.09 a A	0.79 ± 0.14 abc A	0.33 ± 0.12 ab
Qionghai	0.39 ± 0.13 a A	1.44 ± 0.19 cd AB	0.04 ± 0.04 a
Changjiang	4.77 ± 0.39 e D	0.43 ± 0.13 a A	0.47 ± 0.14 ab
Dongfang	0.71 ± 0.20 ab A	1.40 ± 0.30 bcd AB	0.04 ± 0.03 a
Ledong	3.49 ± 0.43 de CD	0.59 ± 0.11 ab A	0.05 ± 0.03 a

Notes: Data in the table are mean±SE. Values followed by different capital letters in the same column are significantly different at 0.01 level, and different small letters are significantly different at 0.05 level.

- longicollis* Olivier. *Plant Prot.*, 28(2), 14-16. (in Chinese)
3. **Tinzaara, W., Dicke, M., Van Huis, A., Van Loon, J.J.A. and Gold, C.S.** (2003). Different bioassays for investigating orientation responses of the banana weevil, *Cosmopolites sordidus*, show additive effects of host plant volatiles and a synthetic male-produced aggregation pheromone. *Entomol. Exp. Appl.*, 106(3), 169-175.
 4. **Tinzaara, W., Gold, C.S., Dicke, M., Van Huis, A. and Ragama, P.E.** (2005). Factors influencing pheromone trap effectiveness in attracting the banana weevil, *Cosmopolites sordidus*. *International J. Pest Manage.*, 51(4), 281-288.
 5. **Tinzaara, W., Gold, C.S., Dicke, M., Van Huis, A., Nankinga, C.M., Kagezi, G.H., and Ragama, P.E.** (2007). The use of aggregation pheromone to enhance dissemination of *Beauveria bassiana* for the control of the banana weevil in Uganda. *Biocontrol Sci. Techn.*, 17(2), 111-124.
 6. **Zhang, K.M.** (1999). Banana pest control. China Agricultural Press, Beijing, China. (in Chinese)
 7. **Zimmerman, E.C.** (1968). Rhynchophorinae of southeastern Polynesia (Coleoptera: Curculionidae). *Pac. Insects*, 10 (1), 47-77.
