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## Importation and Preliminary Evaluation of the Stem Boring Moth *Buakea kaeuae* as a Potential Biological Control Agent of Invasive Guineagrass, *Megathyrus maximus*

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**Importation and Preliminary Evaluation of the Stem Boring Moth *Buakea kaeuae*<sup>1</sup> as a Potential Biological Control Agent of Invasive Guineagrass, *Megathyrus maximus*<sup>2</sup>**

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Boaz Musyoka<sup>5</sup>, and Rupesh R. Kariyat<sup>3</sup>

**Abstract.** Guineagrass, *Megathyrus maximus* (Jacq.) B.K.Simon & S.W.L.Jacobs, is an African grass that is invasive in Florida, Hawaii, southern Texas, and northeastern Mexico. *Buakea kaeuae* Moyal et al., a stem-boring African moth found only on *M. maximus*, was imported from Kenya and evaluated for its ability to feed and develop on Guineagrass naturalized in southern Texas. Neither larvae nor adults developed or reproduced on Texas Guineagrass.

**Resumen.** El zacate Guinea (*Megathyrus maximus* (Jacq.) B.K.Simon & S.W.L.Jacobs), originario de África, es considerado invasivo en Florida, Hawaii, sur de Texas, y noreste de México. *Buakea kaeuae* Moyal et al. es una palomilla específica de *M. maximus* que ataca a los tallos de esta maleza. Esta palomilla fue importada de Kenia y ha sido evaluada por su habilidad para alimentarse y desarrollar su ciclo biológico solo en plantas de zacate guinea, naturalizadas en el sur de Texas. Ni las larvas ni los adultos de *B. kaeuae*, se desarrollan y reproducen en especies de zacate Guinea de Texas.

Guineagrass, *Megathyrus maximus* (Jacq.) B.K.Simon & S.W.L.Jacobs (formerly known as *Panicum maximum* Jacq. and *Urochloa maxima* (Jacq.) R. Webster), is an invasive grass in Florida (Overholt and Franck 2017), Hawaii (Daehler and Carino 1998), southern Texas (Lonard and Judd 2002), and northeastern Mexico (CONABIO 2020). This invasive African grass occurs in two distinct forms: giant and small with the latter invasive in South Texas, and the target of the biological control program (Mercadier et al. 2009, Rhodes et al. in litt.). The giant form has been found along the Rio Grande at Brownsville, TX (Soti et al. 2020). *Megathyrus maximus* is native to much of Africa (CABI 2020). Giant Guineagrass is more common in lowland wet areas, along rivers and creeks. The small form grows in hot, dry upland habitats common in northern Kenya (very similar to South Texas). The small form may be a hybrid between *Megathyrus maximus* and *M. infestus* (*Panicum infestum*) (Bon et al. 2011).

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<sup>1</sup>Lepidoptera: Noctuidae

<sup>2</sup>Poales: Poaceae

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Small Guineagrass was introduced to South Texas as a forage grass and subsequently spread throughout the region. It out-competes other more valuable forage grasses and creates a large fuel load for wildfires that damage native brush species and rangeland ecology of South Texas. Guineagrass and other exotic grasses affect wildlife including northern bobwhite, *Colinus virginianus* L., and scaled quail, *Callipepla squamata* Vigors, because these grasses are not hosts of the native insect fauna. Juvenile quail feed mainly on insects and therefore lack sufficient food for development in exotic grass pastures. Also, exotic grasses tend to reduce the density and diversity of forbs whose seeds may be eaten by quail (Kuvlesky et al. 2002). In Mexico and along the border with Texas, Guineagrass interacts with the southern cattle fever tick, *Rhipicephalus microplus* Canestrini, by reducing populations of tick-feeding beetles and ants and by creating a cool, humid environment that promotes survival of ticks (Esteve-Gassent et al. 2014). Across South Texas, Guineagrass is very invasive in wildlife preserves, citrus (*Citrus* spp. L.) orchards, sugarcane (*Saccharum officinarum* L.) fields, urban landscapes, and along highway right-of-ways. Because this invasive grass is so widespread, mechanical and/or chemical controls are ineffective (Rhodes et al. in litt.). Biological control may be the best option of sustainable management of this widespread exotic weed.

Moyal et al. (2011) identified a new genus and species of specialist stem-boring moths on *M. maximus*, *Buakea kaeuae* Moyal et al., which is specific to small Guineagrass of south-central Kenya. This specialist moth lays eggs on stems of Guineagrass, and the larvae bore into the crown of the grass. Because this insect is very damaging and already known to be specific to small Guineagrass, it was imported for evaluation as a potential biological control agent.

Three shipments of *B. kaeuae* were imported to the U.S. from Kenya in 2016. The insects were originally collected from small Guineagrass at Machakos, Kenya, and identified at the International Centre for Insect Physiology and Ecology, Nairobi, Kenya, by B. Le Ru. At the USDA Arthropod Quarantine Facility at Moore Airbase, Edinburg, TX, several methods were evaluated for rearing the Guineagrass moth. Newly hatched larvae were placed on cut stems or on two different artificial diets (European corn borer and southwestern corn borer diets – Frontier Scientific Services, DE). No larva fed on artificial diet. Larvae fed and stayed alive for more than 3 months using the cut stems of small Guineagrass. Larvae also fed on stems of giant Guineagrass but died within 6 weeks. Larvae were also placed on stems and leaf axils of live plants in both greenhouse and environmental growth chambers. No feeding was observed, and none of the 200 plus larvae survived on the Texas Guineagrass. We also received Guineagrass moth pupae from Kenya. Moths were kept in cages with small or giant Guineagrass for mating and observed daily. No eggs were observed from any adult moth.

In summary, all stages of the Guineagrass moth did not find Texas Guineagrass or the rearing system suitable. This probably indicated that Texas Guineagrass is genetically or phytochemically different from small Guineagrass at Machakos, Kenya. Stem-boring moths are generally difficult to rear, and this also might have contributed to the lack of rearing success.

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