KWAZULU-NATAL PROVINCE
AGRICULTURE AND RURAL DEVELOPMENT
REPUBLIC OF SOUTH AFRICA

Research & Technology
BULLETIN
2024/25-02

Spodoptera exempta, African armyworm, in KwaZulu-Natal grazing pastures

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Spodoptera exempta Walker (Lepidoptera: Noctuidae), commonly known as the African armyworm or the black armyworm, is a destructive migratory insect pest of rangelands, pastures and cereal crops that erupts in episodic outbreaks in African countries (Rose et al. 2000; Redman et al. 2010). It must not be confused with Fall Armyworm (*Spodoptera frugiperda* Smith) which occurs mainly on maize crops (Figure 1).

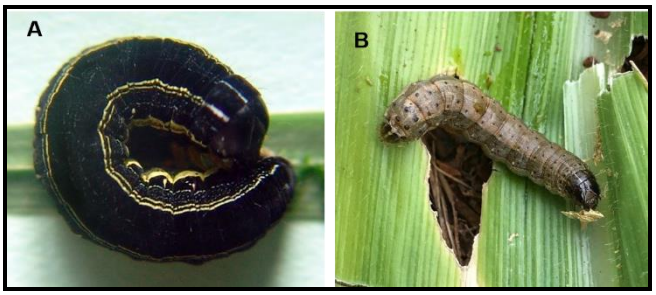

FIGURE 1: Pictures showing the morphological difference between the larval instars of the (A) African armyworm, *Spodoptera exempta* and the (B) Fall armyworm, *Spodoptera frugiperda*.

The outbreaks of the pest severely impact livestock production as the larval instars of the insect destroy grazing lands (Figure 2) (Scott 1991). The insect also feeds on the kikuyu grass (*Pennisetum clandestinum*), which is widely grown in the country to support dairy cattle (Van der Colf et al. 2015). Previously, disease outbreaks and mortality, associated with outbreak of the African armyworm, in dairy cows grazing on the kikuyu grass were reported. Clinical signs in affected animals include constipation, drooling of saliva, recumbency, depression, incoordination, ruminal bloat and hypomotility, evidence of colic and dehydration (Bryson 1982; Newsholme et al. 1983). The animals will also show a distinctive feature, known as sham drinking, whereby the affected animals congregate around a body of water but fail to drink, even though they place their mouths on or into the water (Martinovich and Smith 1973). Pathological changes occur in the forestomach of the animals where the rumen is becomes filled with homogeneous, sloppy contents. Extensive necrosis of the forestomach mucosa is also observed in ruminants (Newsholme et al. 1983).

FIGURE 2: Pictures showing (A) damage cause by the African armyworm to pastures and (B) infestation of the insect in a field.

In South Africa, small outbreaks occur mostly in the high rainfall areas of the KwaZulu-Natal and Mpumalanga provinces on a regular basis, with major outbreaks occurring only every five to ten years. Areas with late summer rainfall climatic conditions in South Africa experience severe outbreaks, especially following draught conditions. The severity of

outbreaks varies on a yearly basis, and larval outbreaks may extend over many square kilometers (Grzywacz et al. 2008). The presence of the insect pest in a field is characterized by extensive feeding damage to foliage, and in severe cases complete defoliation and destruction of the plants to ground level within few days (Figure 2) (Li 2024).

The morphology of the African armyworm larvae is characterized by their black body colour with, light green or yellow stripes down the length of their bodies, and a V shaped mark on the head (Figure 3). The adult stage moths of the insect pest are characterized by their brown body colour with white hindwings and darker patterns on the forewings (Figure 4).

FIGURE 3. The larval instar of the African armyworm, *Spodoptera exempta*.

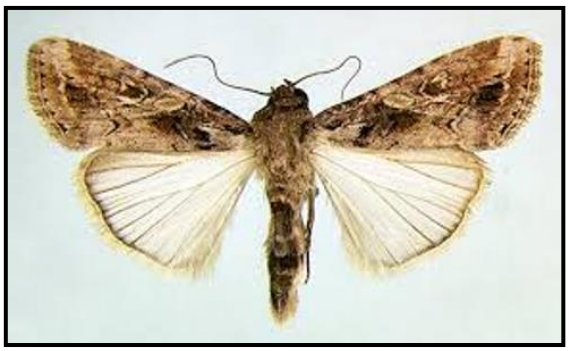

FIGURE 4. The adult moth of the African armyworm, *Spodoptera exempta*.

Management of the African armyworm, *Spodoptera exempta*, and recommendations

Various techniques are currently used to manage the presence of this insect pest in both grazing land and crop production areas. To prevent extensive movement of feeding larvae across fields, farmers usually dig trenches of up to 30 cm in depth with vertical sides and the insect larvae that gets caught in the trenches is collected and destroyed. Natural enemies and pathogens, specifically the baculovirus *S. exempta* nucleopolyhedrovirus (SpexNPV), are also used for management of the insect pest and effective when applied when the insect is 1 - 5 mm in length (Rose et al. 2000; Mushobozi et al. 2005). Previously, field trials showed that both aerial and ground application of SpexNPV to armyworm outbreaks on pasture can initiate outbreaks of NPV disease and result in population collapses with larval mass mortality occurring three to ten days after application (Grzywacz et al. 2008). Commercial insecticides containing the bacterial entomopathogen *Bacillus thuringiensis* have also shown potential for successful management of the insect.

The application of synthetic chemical insecticides, such as carbamates and synthetic pyrethroids, is the common management method of outbreaks. The pyrethroids are also known to be effective when applied at low dose rates using Ultra Low Volume (ULV) spraying method. However, the insecticide has a withholding period of 14 days, which is a minimum number of days between last application and grazing. The use of Pyrethrum powder: 20 g powder /10 L water is also known to be effective.

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