Gynandromorphs are chimeric individuals that present masculine and feminine tissues in its body (Narita et al., 2010). They have been found in natural and laboratory populations of arthropods (Maeno and Tanaka, 2007; Sagar et al., 2020). According to the distribution of male and female features throughout the body, gynandromorphs are classified into anteroposterior (anterior and posterior sides are of different sexes), bilateral (right and left sides are of different sexes), transversal (asymmetric distribution), or mosaic distribution (random distribution of characters along the body) (Michez et al., 2009).

The bilateral gynandromorphism is more frequent among insects, although other forms with any distribution of sexual characters are also known (Dutto et al., 1767; Dang and Peterson, 1979; Davis, 1994; D’Entreves and Roggero, 2013; Renjith and Chandran, 2020). This phenomenon is more frequent among invertebrates, but relatively common among bees, especially in *Megachile* sp. (Wcislo et al., 2004).

The fall armyworm (FAW) *Spodoptera frugiperda* (Smith, 1797) is the most important corn pest in South America and is a global pest of corn occurs worldwide (Blanco et al., 2016; Fan et al., 2020). A gynandromorph FAW adult was found and reported for the first time in Minas Gerais State, Brazil, among the progeny of a laboratory rearing population and exhibited dimorphism in the antennae, wings, head, thorax, and abdomen. It had a male left side and a female right side. Both the external and internal genitalia were typically those of a male.

The gynandromorph moth emerged from a male pupa that had been sexed using the morphological features on the terminal abdominal segments. Prior to imaging, the specimen was maintained at -15°C for 5 minutes to remain immobile. We used a Faxitron X-Ray Corp (Wheeling, IL, USA) and a LEICA M205 A Stereomicroscope coupled with a digital camera to capture high-resolution images of the specimen. The images were used to identify and describe the gynandromorph trait in detail.
with a LEICA MC170 HD camera in the Ecotoxicology and Ecophysiology Laboratory and in the Termiteology Laboratory of the Federal University of Viçosa, respectively. The gynandromorph specimen was deposited in the Entomology Museum of the Federal University of Viçosa.

The moth (Fig. 1a-f) exhibited bilateral dimorphism in the antennae, wings, head, thorax, and abdomen. It had a male left side and a female right side (Fig. 1a). The genitalia were typically those of a male (Fig. 1e, 1f) and (Fig. 2a-c). The clasper was visible in the X-ray image, but it appears to be less developed than that of a normal FAW (Fig. 2a, 2c) (Quimbayo et al., 2010). Sagar et al. (2020) already reported a bilateral gynandromorph for a FAW in natural conditions, although the specimen presented asymmetrical genitalia with male structures in one half of the body and female in the other.

The forewing of the male side had a brownish to rusty brown color, with a white patch near to the apical margin and a longitudinal black line near to the basal margin (Fig. 1a). It had an oval yellowish-brown oblicular spot and a reniform spot with an outline partially black washed, with a small white v-like marking (Fig. 1a). In addition, a conspicuous transparent spot in the M3 and CuA1 veins junction was seen (Fig. 1a). The forewing of the female side had a greyish-black color (Figs. 1a, 1b). Both hindwings were white, with outer, anal, and inner margins black washed, mainly on the female side (Fig. 1d). The male side abdomen had a brownish color and the female side a greyish-black color (Fig. 1d). In ventral view, each abdominal sternite had a central black marking (Fig. 1b). All these traits were similar to those of a normal FAW specimen (Brévault et al., 2018; Sharanabasappa et al., 2018; Bajracharya et al., 2019).

Gynandromorphism is produced by an unequal distribution of chromosomes, especially the sexual (Mayr et al., 1953). They normally result from either loss or addition of a sex chromosome early during development, from fertilization of a binucleated egg, or delayed syngamy (Cooper, 1959; Homsher and Yunker, 1981; Narita et al., 2010). Some of the known reasons for the gynandromorph abnormalities are extreme temperatures, ultraviolet light, viral infections, and translocations of parts of the sex chromosomes and/or autosomes (Drescher and Rothenbuhler, 1963; Nekrutenko, 1965; Blau, 1978; Riotte, 1978; Marec et al., 2001). For Lepidopteran like Bombyx mori, that have a female-heterogametic chromosomal constitution (i.e., ZZ: male; ZW: female), double fertilization of a binucleate egg (ZW) by Z.

Figure 1 Gynandromorph adult of the fall armyworm (FAW) Spodoptera frugiperda. A. Habitus in dorsal view, with a male left side and a female right side, showing oblicular spot, reniform spot, white patch, and spot at M3 + CuA1; B. Habitus in ventral view; C. Detail of a dimorphism in the antennae, wings, head, and thorax; D. Detail of a dimorphism in the abdomen; E. Last abdominal segment; F. Last abdominal segment of a normal male FAW.
sperms is thought to be the major cause of gynandromorphs generation (Goldschmidt and Katsuki, 1927). Other potential causal agents of gynandromorphism are the mutations, genetic incompatibilities, and Wolbachia infection (Pereira et al., 2003; Kageyama et al., 2012). We encourage the worldwide biological collections to document the gynandromorphic and aberrant individuals deposited, such as the frequency and morphology of their deformities, an important information with applications in pest management and biomedicine (Narita et al., 2010; Sánchez-Murillo et al., 2013; Eastwood and Wood, 2019).

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Conflicts of interest

The authors declare that they have no conflict of interest.

Author contribution statement

All authors contributed to the study conception. NDSR conceived the research, conducted the laboratory work and wrote the document. JFML elaborated the final plates and the morphological description of the specimen. ERL supported the rearing of the specimens and disponibilize the laboratory for developing this research. All authors read, critically reviewed and approved the final version of this scientific note.

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