New records of *Zaprionus indianus* Gupta, 1970 (Diptera, Drosophilidae) in North America and a key to identify some *Zaprionus* species deposited in the Drosophila Tucson Stock Center.

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The old world native species from subgenus *Zaprionus* and species group *armatus*, *Zaprionus indianus* Gupta, 1970 (Chassagnard, 1988; Chassagnard and Kraaijeveld, 1991; Chassagnard and Tsacas, 1993), was first recorded in the Western Hemisphere in San Paulo, Brazil. Vilela (1999) suggested that the species might have colonized Brazil from the U.S.A. Obviously, no previous records substantiated such an idea. In Brazil, *Z. indianus* was recognized as an active pest mainly in commercial figs where eggs laid at the ostiole gave easy access to the fruit (Vilela *et al.,* 2001; Raga *et al*., 2003). Although *Z. indianus* was reared from several hosts (van der Linde *et al.*, 2006), in all cases the fruit had previous damage. *Zaprionus indianus* spread rapidly through South America where it has established large populations (Castro and Valente, 2001; Goní *et al.,* 2002; Dobbin *et al*., 2004; David *et al.,* 2005). In 2003, a few *Z. indianus* were collected from Isla Contadora, Panama. Then, *Z. indianus* was collected in several Florida counties in 2005 and individuals' numbers are increasing (van der Linde *et al.,* 2006). Apparently, colonization through the Caribbean is the logical explanation for the *Z. indianus* presence in the southeast U.S.A. However, here I present some records from Mexico, a potential alternative route for the incipient *Z. indianus* colonization of the Western U.S.A. Another hypothesis for *Z. indianus* colonization of the western America is through the ports.

University of Arizona *Drosophila* researchers collect continually from Mexico using banana baits in two-liter soda containers as described in O'Grady and Markow (2006). In May 2002, on a *Drosophila* collection trip scheduled in the states of Puebla, Oaxaca and Chiapas, three males and one female of *Z. indianus* were captured three kilometers north of Chiapa de Corzo, Chiapas (16.74^{o}N, 92.97^{o}W) close to citrus/mango groves. In this sample, 96.4% were *simulans/melanogaster* where *Z. indianus* represented only 0.2% of the sample. The second *Z. indianus* collection took place in January 2004 during a collection trip carried out in the states of Michoacán, Estado de México, Jalisco and Sinaloa. One *Z. indianus* male was captured in El Tuito, Jalisco (20^{o}19.1' N, 105^{o}19.02' W), in a semi caducifolic rainforest. On this occasion, *Z. indianus* was collected along with indigenous species such as *D. aldrichi*, *D. eremophila, D. nigricruria* and *D. gibberosa.* The latest Mexican collection of *Z. indianus* was made recently, in San Carlos, Sonora (27.97^{o}N, 110.99^{o}W) when two males were caught in a trash site close to orange/guava/mango groves (December 2006). The species composition in this collection was *D. simulans, D. melanogaster, D. hydei, D. arizonae, D. spenceri, D. repleta, D. pseudoobscura,* and *Z. indianus* (with *Z. indianus* comprising 0.3%).

On the other hand, in 2006 took place the first record of *Z. indianus* in Western United States. In October, one *Z. indianus* male was collected north San Diego bay, California, along with *D. melanogaster* and *D. simulans*. Collection place and the environment was unknown. In the same month, six females and 12 males of *Z. indianus* were collected from banana baits in Tucson, Arizona (32.22^{o}N, 110.91^{o}W), during the Annual Drosophila Workshop sample demonstrations. Banana bait was located close to citrus and pomegranate (*Punica granatum*) trees. Other species collected in the same bait were *D. simulans, D. melanogaster*, *D. aldrichi, D. longicornis, D. hydei, D. pseudoobscura, D. azteca, D. nigrohydei, D. repleta* and *D. busckii*.

Finally, the Tucson Drosophila Stock Center holds ten species in the *Zaprionus* genus. Jean David from L.E.G.S. in the National Scientific Research Center- (France) kindly donated and identified most of them in 2006. Here is a key to identify these species.

1. Fore femur with short stout knob, or tubercle, located near middle of the posteroventral surface.…….. **2**
1b. Fore femur unadorned or if knobs present, they are the small base of the setae and no tubercle structure exist.…….……..……... **3**

2. Ventral surface of knob with one straight seta…..…….**9**
2b. Ventral surface of knob with two strong setae; dorsal surface with a single seta…..……..... *sepsoides*

3. Wings strongly shining (reflective), brownish……..…….……...*badyi*
3b. Wings hyaline, without shining brownish color…..…… **4**

4. Scutellum with a white apical spot…….. *ghesquierei*
4b. Scutellum lacking apical white spot……...…….……. **5**

5. Frons with a fine, white medial stripe anterior to ocelli…..…….……..… *inermis*
5b. Frons without a fine, white medial stripe..…….…….…..... **6**

6. Dark species; scutellum black. Mesonotum with two black central bands. Each band has two-dorsocentral setulae rows.…….…….....…. *camerounensis*
6b. Yellowish species; scutellum and mesonotum have same color. No black central bands in mesonotum……..…….....…….. **7**

7. Tergites without apical band…..……...……..….. *davidi*
7b. At least two tergites with visible (or almost) apical bands…….. **8**

8. A faint, almost translucent dark band in the apical margin of tergites 2-5. Sub-apical setae in tergites 4-5 arise from dark spot…….....….. *indianus*
8b. A dark band in the apical margin of tergites 2-5. No spots on tergites……..… *taronus*

9. Flagellomere black. Frons lacking white medial stripe……..…….. *mascariensis*
9b. Flagellomere yellow. Frons with a fine, white medial stripe anterior to ocelli.…… *tuberculatus*

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Expression profile analysis of *menin1* mutants.

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The absence of the tumor suppressor Menin results in multiple endocrine neoplasia type I (MEN1) in humans (reviewed by Agarwal *et al.*, 2004). *Drosophila* Menin is encoded by *mnn1* (Guru *et al.*, 2001). We assayed the effect of *mnn1* loss-of-function and *mnn1* over expression on adult flies and embryos by microarray experiments and found remarkably little change in expression correlated with *mnn1* genotype, suggesting that *mnn1* has very little effect on gene expression under the tested conditions.

Mammalian Menin is a classic tumor suppression protein, where tumors occur in individuals heterozygous for loss-of-function alleles. Additionally Menin is required for embryonic development, as homozygous embryos die showing hemorrhages and defective neural tube closure (reviewed by Agarwal *et al.*, 2004). In contrast, the *Drosophila Menin1* gene (*mnn1*) is not required for viability, but appears to alter response to stress according to two somewhat incongruent reports (Papaconstantinou *et al.*, 2005; Cerrato *et al.*, 2006). Flies mutant for *mnn1* are also sensitive to mutagens, suggesting that *Drosophila* Menin plays a role in DNA repair (Busygina *et al.*, 2004; Busygina *et al.*, 2006). There is abundant evidence suggesting that Menin interacts with transcription factors (reviewed by Agarwal *et al.*, 2004), including AP1 in both *Drosophila* and mammals (Cerrato *et al.*, 2006). In *Drosophila*, thoracic closure and eye development are particularly susceptible to lowered or raised *mnn1* expression in the context of AP1 mis-expression (Cerrato *et al.*, 2006). In mammals, Menin is a subunit of a Trithorax Complex that methylates Histone H3 at Lysine 4 (Hughes *et al.*, 2004; Yokoyama *et al.*, 2004; Chen *et al.*, 2006; Scacheri *et al.*, 2006). Trithorax complexes typically regulate large batteries of genes, and have especially well studied roles in the regulation of HOX genes (Schuettengruber *et al.*, 2007). Indeed, mammalian Menin is a regulator of at least one HOX gene (Hughes *et al.*, 2004; Yokoyama *et al.*, 2004). Interestingly, even though Menin is bound at many active promoters in mammalian cells, the loss of Menin has very little effect on transcription (Scacheri *et al.*, 2006). To determine if Menin has a general role in transcription in *Drosophila*, we assayed global gene expression in flies lacking or over expressing relative to wild type flies.

We isolated mRNA from *y w; mnn1*$^{\Delta 46}$ and *y w; mnn1*$^{\Delta 79}$ (both are protein null alleles on *mnn1*) adult flies, as well as mRNA from the isogenic *y w; mnn1*$^{+84}$ and *y w; mnn1*$^{+113}$ flies (precise excision lines of the P-element used to generate the null alleles), another *y w* line, and mRNA from heterozygous combinations of *mnn1* alleles. These samples were labeled and hybridized to Affymetrix DrosGenome1 arrays. Gene expression profiles for both females and males were performed, for a total of eleven hybridizations were performed and are available from the Gene