

First record of *Drosophila suzukii* (Diptera: Drosophilidae) in Honduras: Implications for agricultural ecosystems

Yefrin Valladares^{1,*} , Virna López^{2,3} , Karen Enamorado³ , Olga Pineda² , Luis Sorto³, Mauricio Hernández^{2,4,*} 

- (1) Departamento de Ecología y Recursos Naturales, Escuela de Biología, Facultad de Ciencias, Universidad Nacional Autónoma de Honduras, Tegucigalpa, 11101, Honduras.
- (2) Departamento de Biología Celular y Genética, Escuela de Biología, Facultad de Ciencias, Universidad Nacional Autónoma de Honduras, Tegucigalpa, 11101, Honduras.
- (3) Departamento de Ciencias Naturales, Universidad Pedagógica Nacional Francisco Morazán, Tegucigalpa, 11101, Honduras.
- (4) Instituto de Investigaciones en Microbiología, Facultad de Ciencias, Universidad Nacional Autónoma de Honduras, Tegucigalpa, 11101, Honduras.

* Corresponding authors / Autores de correspondencia: Virna López [virna.lopez@unah.edu.hn]; Mauricio Hernández [delmer.hernandez@unah.edu.hn]

> Received / Recibido: 25/03/2025 – Accepted / Aceptado: 20/05/2025

How to cite / Cómo citar: Valladares, Y., Lopez, V., Pineda, O., Enamorado, K., Sorto, L., Hernández, M. 2025. First record of *Drosophila suzukii* (Diptera: Drosophilidae) in Honduras: Implications for agricultural ecosystems. *Ecosistemas* 34(2): 3022. <https://doi.org/10.7818/ECOS.3003>

The spotted wing drosophila (*Drosophila suzukii*; Diptera: Drosophilidae) is an invasive fruit pest that causes severe damage to fruit production systems. Invasive species are recognized among the main drivers of biodiversity loss worldwide (Dos Santos et al. 2017), leading to significant impacts on ecosystem integrity and detrimental effects (Adrion et al. 2014). The ability of invasive species to spread beyond their native range is associated with fast growth rates, efficient dispersal capacity and broad environmental tolerance compared to native species (Catford et al. 2016). Drosophilidae is a diverse and cosmopolitan family with more than 4600 species (Miller et al. 2017), and the genus *Drosophila* includes ~1500 species (Dos Santos et al. 2017). The spotted-wing drosophila (*Drosophila suzukii*; Matsumura, 1931) is an invasive fly native to Southeast Asia, and now reported throughout North America and Europe (Hauser 2011; Dos Santos et al. 2017). *Drosophila suzukii* is a serious pest, infesting soft fruits and berries, with females laying eggs on healthy ripening fruit (Tungadi et al. 2023). The pierces performed by *D. suzukii* favor the colonization of opportunistic organisms, increasing economic loss in agriculture systems (Fartyal et al. 2014). Earlier studies have estimated annual losses of up to \$500 million per year, representing damage levels of 30% (Bolda et al. 2010; Goodhue et al. 2011). However, there is little information about the potential distribution in Latin America. It has been reported in Argentina, Brazil, Chile, Mexico, and Uruguay (García et al. 2022), and more recently in Costa Rica (Chacón-Cerdas et al. 2024). In Honduras, the presence of *D. suzukii* has not been reported. The aim of this study is to report for the first time the occurrence of *D. suzukii* in Honduras, and consequently to raise awareness about the potential risk of its geographical expansion.

The collection area was in Los Pinares (La Libertad, Comayagua, Honduras), situated at 1275 m a.s.l. (87°32'20''O 14°50'4.2''N) (Fig. 1). The area is characterized by a coffee agroforestry system mainly composed of coffee trees in combination with shade trees (e.g. *Psidium guajava*, *Citrus sinensis*, *Musa* spp., *Inga edulis* and *Liquidambar styraciflua*), coniferous and herbaceous plants. The mean annual precipitation is 1500 mm, temperature ranges from 21.4 °C to 30.6 °C, and relative humidity of 49%.

The samples were collected on November 12th and 23rd 2024. Our sampling campaigns were mainly focused on *D. melanogaster*, as a part of The European Drosophila Population Genomics Consortium (DrosEU, <https://droseu.net>), a project assessing the spatial and temporal scale of evolution across Europe and beyond. Therefore, sampling was conducted following the standard DrosEU protocol (Kapun et al. 2020). *Drosophila* individuals were directly collected from rotten fruits using a homemade vacuum to suck flies. Specimens were placed in 70% ethanol and stored at room temperature for further identification at the Universidad Nacional Autónoma de Honduras (UNAH). For the identification, males were first separated from females; then males were morphologically separated into *D. melanogaster*, *D. simulans*, *D. suzukii* and unknown males. Adult individuals of *D. suzukii* were examined under a stereomicroscope and taxonomically identified using dichotomous keys (Takamori et al. 2006; EPPO 2013). The identification was confirmed by Dr. Josefa González (gonzalezlab.eu) on the basis of photographic material. Voucher specimens were deposited in the Entomology Museum of the UNAH.

Based on the external morphological traits, two adult male individuals were identified as *D. suzukii*. The specimen measured ~2.5 mm in length and ~0.7 mm in width, with yellowish-brown body coloration and abdominal tergites with blackish transverse sclerites (Fig. 2A), a prominent mesothorax and scutellum (Fig. 2B). We also observed the sex combs on the first pair of legs (Fig. 2C). The membranous wing structure measured ~2.3 mm in length and ~1.1 mm in width, with the characteristic dark spot on the distal margin of the wings (Fig. 2D).

Drosophila suzukii has been intensively studied due to its ecological features and negative impact on agricultural systems. Predictive models have suggested a rapid expansion in North and South America (Dos Santos et al. 2017), but there is little information about its distribution in Central America. Recently, Chacón-Cerdas et al. (2024) documented for the first time the presence of *D. suzukii* in Costa Rica, highlighting that *D. suzukii* has been established in blackberry crops. Here, we found two adult male individuals in a coffee system intercropped with shade trees and fruit plants. We hypothesized that the incidental capture of *D. suzukii* in November may be related to ripening fruits, as reported in the EPPO database. In line with our results, temporal patterns have been reported otherwise (Baroffio et al. 2014; Łabanowska and Piotrowski 2015). Moreover, given that *D. suzukii* tends to colonize high-altitude areas (Hussain et al. 2020), its presence in Los Pinares may represent a complex issue for native fauna due to its colonization capacity and resource competition (Catford et al. 2016), but also for economic loss of local agricultural production.

The presence of *D. suzukii* also raises the question of its origin or arrival pathways in Honduras. Depending on microclimate conditions, it can travel up to 100 m per day (Wong et al. 2018; Tait et al. 2020) or 1,400 km per year (Calabria et al. 2012), likely resulting from both active (diffusion) and passive (human transport) spread. In our case, we consider that *D. suzukii* was probably unintentionally introduced through imported fruits, as invasive species can colonize new geographical regions through human-mediated dispersal (Estay et al. 2023). Furthermore, the low number of *D. suzukii* detected in both sampling campaigns might not yet represent a serious threat to native species. However, further studies are required to fully understand its population dynamics and interspecies competition and thereby create effective plant management to avoid future damages. Overall, our findings may provide a valuable reference framework for developing phyto- and zoo-sanitary management strategies within the integrated pest management approach for *D. suzukii* and thus prevent potential spread to other regions and protect local crops and agricultural systems.

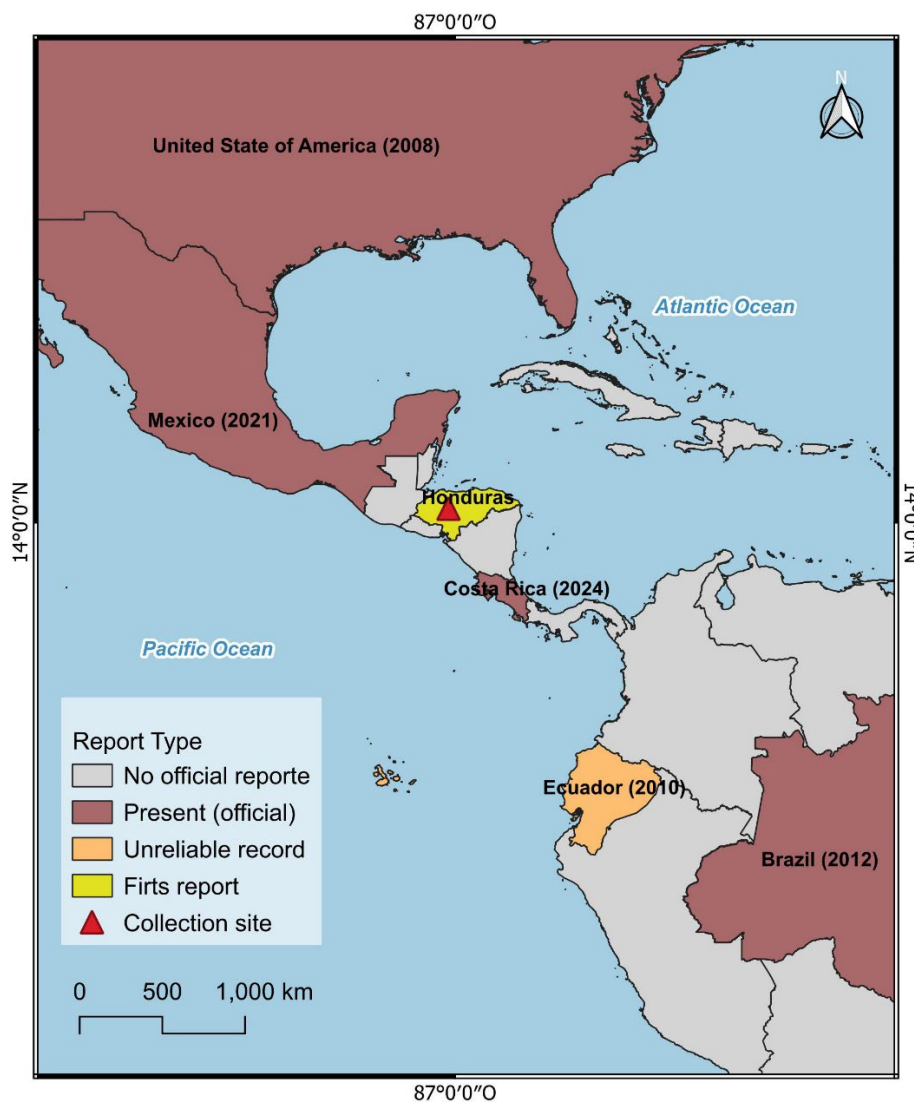


Figure 1. Regional map of *D. suzukii* reports by date and collection site in the central region of Honduras (La Libertad, Comayagua).

Figura 1. Mapa regional de reportes de *D. suzukii* por fecha y sitio de colecta en la región central de Honduras (La Libertad, Comayagua).

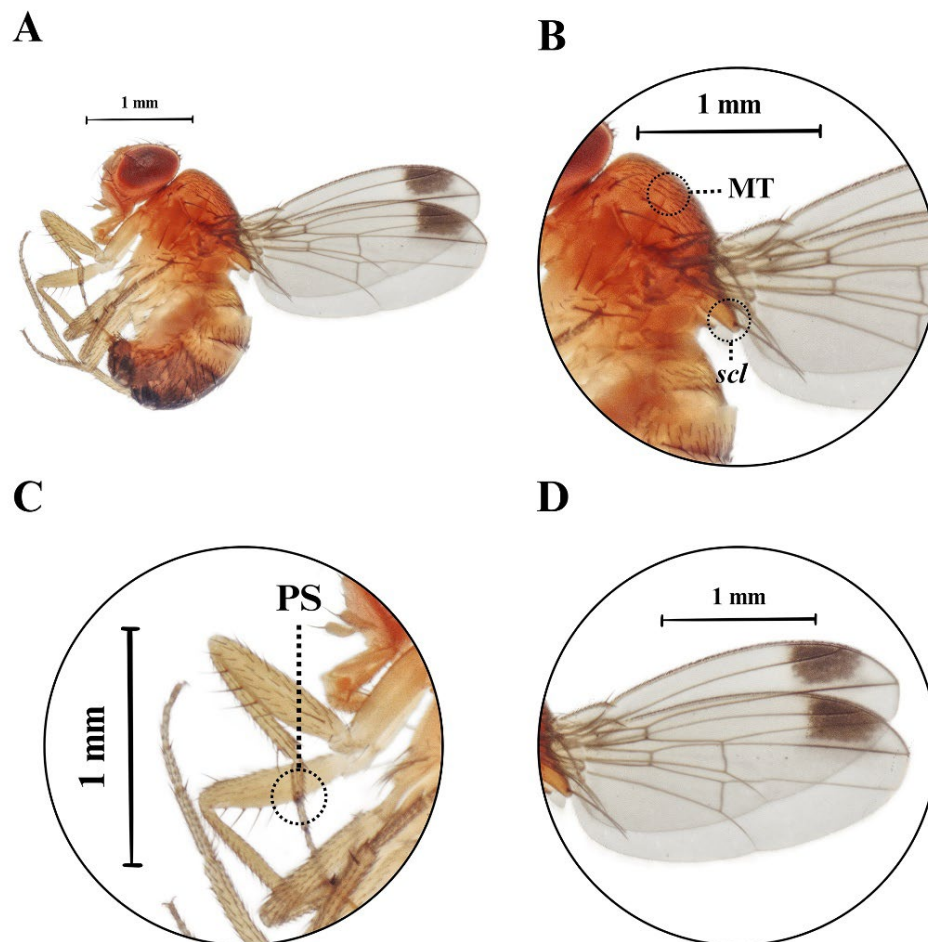


Figure 2. *Drosophila suzukii* captured in November 2024 in Honduras (transient). **A)** lateral view of an adult male. **B)** A close-up of the mesothorax (MT) and scutellum (scl). **C)** A magnified view of the posterior spur (PS) on the leg. Sex combs on the first and second tarsomere of male's forelegs. **D)** Dark apical spots can be observed in the wings. Scale bar – 1 mm (Photo by Yefrin Valladares).

Figura 2. *Drosophila suzukii* capturada en noviembre de 2024 en Honduras (transitoria). **A)** Vista lateral de un macho adulto. **B)** Primer plano del mesotórax (MT) y del escutelo (scl). **C)** Vista ampliada del espolón posterior (PS) de la pata. Peines sexuales en el primer y segundo tarsómero de las patas delanteras del macho. **D)** Se observan manchas oscuras apicales en las alas. Barra de escala - 1 mm (Foto de Yefrin Valladares).

Authors' contribution

Yefrin Valladares: Writing – original draft, Conceptualization, Investigation, Visualization. Virna López: Writing – original draft, Conceptualization, Investigation, Supervision, Funding acquisition. Karen Enamorado, Olga Pineda, Luis Sorto: Investigation, writing and review. Mauricio Hernández: Writing – original draft, Conceptualization, Investigation, Visualization, Supervision. All authors have read and agreed to the final version of the manuscript.

Financing, required permits, potential conflicts of interest and acknowledgments

This study was partially supported by the European *Drosophila* Population Genomics Consortium and by the citizen science project “*Melanogaster*: Catch The Fly!” funded by FECYT-Ministerio de Ciencia, Innovación y Universidades (FCT-23-19527).

The authors declare no conflict of interest.

The authors thank Dr. Josefa González for her review and comments on the manuscript. We also thank Dr. Daniel Rivera-Duarte and Joel Ortega for their technical support with the photos. The participation of students of Evolution from UNAH and Genetics from UPNFM was key to achieving these results.

References

- Adrion, J.R., Kousathanas, A., Pascual, M., Burrack, H.J., Haddad, N.M., Bergland, A.O., Machado, H., et al. 2014. *Drosophila suzukii*: The Genetic footprint of a recent, worldwide invasion. *Molecular Biology and Evolution* 31(12): 3148–3163. <https://doi.org/10.1093/molbev/msu246>
- Baroffio, C.A., Richoz, P., Fischer, S., Kuske, S., Linder, C., Kehrl, P. 2014. Monitoring *Drosophila suzukii* in Switzerland in 2012. *Journal of Berry Research* 4(1): 47–52. <https://doi.org/10.3233/JBR-140066>
- Bolda, M.P., Goodhue, R.E., Zalom, F.G. 2010. Spotted wing *Drosophila*: potential economic impact of a newly established pest. *ARE Update* 13: 5–8.
- Catford, J.A., Baumgartner, J.B., Vesk, P.A., White, M., Buckley, Y.M., McCarthy, M.A. 2016. Disentangling the four demographic dimensions of species invasiveness. *Journal of Ecology* 104(6): 1745–1758. <https://doi.org/10.1111/1365-2745.12627>
- Calabria, G., Máca, J., Bächli, G., Serra, L., Pascual, M. 2012. First records of the potential pest species *Drosophila suzukii* (Diptera: Drosophilidae) in Europe. *Journal of Applied Entomology* 136(1–2): 139–140. <https://doi.org/10.1111/j.1439-0418.2010.01583.x>
- Chacón-Cerdas, R., González-Herrera, A., Alvarado-Marchena, L., González-Fuentes, F. 2024. Report of the establishment of *Drosophila suzukii* (Matsumura, 1931) (Diptera: Drosophilidae) in Central America. *Entomological Communications* 6: ec0600. <https://doi.org/10.37486/2675-1305.ec06003>
- Dos Santos, L.A., Mendes, M.F., Krüger, A.P., Blauth, M.L., Gottschalk, M.S., Garcia, F.R.M. 2017. Global potential distribution of *Drosophila suzukii* (Diptera, Drosophilidae). *PLoS ONE* 12(3): e0174318. <https://doi.org/10.1371/journal.pone.0174318>
- EPPO 2013. Diagnostics PM 7/115 (1) *Drosophila suzukii*. *Bulletin OEPP/EPPO* 43: 417–424. <https://doi.org/10.1111/epp.12059>
- Estay, S.A., Silva, C.P., López, D.N., Labra, F.A. 2023. Disentangling the spread dynamics of insect invasions using spatial networks. *Frontiers in Ecology and Evolution* 11: 1124890. <https://doi.org/10.3389/fevo.2023.1124890>
- Fartyal, R., Sarswat, M., Lhamo, N., Chandra, P. 2014. Records of *Zaprionus indianus* and *Drosophila suzukii indicus* as invasive fruit pests from mid valley region of Garhwal Uttarakhand, India. *Drosophila Information Service* 97: 119–123.
- García, F.R.M., Lasa, R., Funes, C.F., Buzzetti, K. 2022. *Drosophila suzukii* management in Latin America: current status and perspectives. *Journal of Economic Entomology* 115(4): 1008–1023. <https://doi.org/10.1093/jeet/toac052>
- Goodhue, R.E., Bolda, M., Farnsworth, D., Williams, J.C., Zalom, F.G. 2011. Spotted wing drosophila infestation of California strawberries and raspberries: economic analysis of potential revenue losses and control costs. *Pest Management Science* 67(11): 1396–1402. <https://doi.org/10.1002/ps.2259>
- Hussain, B., Akbar, S.A., Rehman, M., Nabi, S., Ganie, S.A., War, R. 2020. Report of *Drosophila suzukii* (Matsumura) (Diptera: Drosophilidae) from the high-altitude and cold arid region of Ladakh, India. *Bulletin OEPP/EPPO Bulletin* 50: 576–577. <https://doi.org/10.1111/epp.12699>
- Hauser, M. 2011. A historic account of the invasion of *Drosophila suzukii* (Matsumura) (Diptera: Drosophilidae) in the continental United States, with remarks on their identification. *Pest Management Science* 67(11): 1352–1357. <https://doi.org/10.1002/ps.2265>
- Kapun, M., Barrón, M.G., Staubach, F., Obbard, D.J., Wiberg, R.A.W., Vieira, J., Goubert, C., et al. 2020. Genomic analysis of european *Drosophila melanogaster* populations reveals longitudinal structure, continent-wide selection, and previously unknown DNA viruses. *Molecular Biology and Evolution* 37(9): 2661–2678. <https://doi.org/10.1093/molbev/msaa120>
- Łabanowska, B.H., Piotrowski, W. 2015. The spotted wing drosophila *Drosophila suzukii* (Matsumura, 1931) – Monitoring and first records in Poland. *Journal of Horticultural Research* 23(2): 49–57. <https://doi.org/10.2478/johr-2015-0020>
- Miller, E.M., Marshall, S.A., Grimaldi, D.A. 2017. A review of the species of *Drosophila* (Diptera: Drosophilidae) and genera of Drosophilidae of northeastern North America. *Canadian Journal of Arthropod Identification* 31: 1–232.
- Tungadi, T.D., Powell, G., Shaw, B., Fountain, M.T. 2023. Factors influencing oviposition behaviour of the invasive pest, *Drosophila suzukii*, derived from interactions with other *Drosophila* species: potential applications for control. *Pest Management Science* 79(11): 4132–4139. <https://doi.org/10.1002/ps.7693>
- Tait, G., Cabianna, A., Grassi, A., Pfab, F., Oppedisano, T., Puppato, S., Mazzoni, V., et al. 2020. *Drosophila suzukii* daily dispersal between distinctly different habitats. *Entomologia Generalis* 40(1): 25–37. <https://doi.org/10.1127/entomologia/2019/0876>
- Takamori, H., Watabe, H., Fuyama, Y., Zhang, Y., Aotsuka, T. 2006. *Drosophila subpulchrella*, a new species of the *Drosophila suzukii* species subgroup from Japan and China (Diptera: Drosophilidae). *Entomological Science* 9: 121–128. <https://doi.org/10.1111/j.1479-8298.2006.00159.x>
- Wong, J.S., Cave, A.C., Lightle, D.M., Mahaffee, W.F., Naranjo, S.E., Wiman, N.G., Woltz, J.M., et al. 2018. *Drosophila suzukii* flight performance reduced by starvation but not affected by humidity. *Journal of Pest Science* 91(4): 1269–1278. <https://doi.org/10.1007/s10340-018-1013-x>