

# Chemical Factsheet

## Sulfoxaflor

### General Information

- Product Names:  
CLOSER SC  
TRANSFORM WG
- Chemical Class: Systemic sulfoximine insecticide, although some classify it as a neonicotinoid insecticide
- Uses: Restricted applications for post-bloom only for crops that are attractive to bees: Barley, triticale, wheat, turf grass; are harvested before bloom: Brassica leafy vegetables, Bulb vegetables, Leafy vegetables (non-Brassica) and watercress, Leaves of root and tuber vegetables, Root and tuber vegetables; and post-bloom applications for bee attractive crops: Berries (grape, blueberry, cranberry), Canola, Fruiting vegetables (tomato, pepper, eggplant) and okra, Pome fruit, Ornamentals, Potato, Stone fruit, Succulent and dry beans, Tree nuts and pistachio.
- Beyond Pesticides rating: [Toxic](#)

### Health and Environmental Effects

*See citations at end of document.*

- Cancer: Suggestive evidence (1)
- Endocrine Disruption: Not documented
- Reproductive Effects: Not documented
- Neurotoxicity: Not documented
- Kidney/Liver Damage: Not documented
- Sensitizer/ Irritant: Not documented
- Birth/Developmental: Not documented
- Detected in Groundwater: Not documented
- Potential Leacher: Not documented
- Toxic to Birds: Not documented
- Toxic to Fish/Aquatic Organisms: Not documented
- Toxic to Bees: Yes (1)

### Additional Information

- Regulatory Status:
  - [EPA Decision to Register the Insecticide Sulfoxaflor with Limited Uses and Pollinator Protective Requirements](#) (10/2016)
  - [Beyond Pesticides' Proposed Registration comments](#) (06/2016)
  - [2015 Cancellation Order for Sulfoxaflor](#)
  - [Beyond Pesticides' Proposed Registration comments](#) (02/2013)
- Supporting information:
  - [Federal Court Overturns EPA Approval of New Bee-Killing Insecticide Sulfoxaflor](#)
  - [Sulfoxaflor: Daily News Blog](#)
- Studies [compiled from the [Pesticide-Induced Diseases Database](#)]

- [Bees under interactive stressors: the novel insecticides flupyradifurone and sulfoxaflor along with the fungicide azoxystrobin disrupt the gut microbiota of honey bees and increase opportunistic bacterial pathogens.](#) Al Nagggar, Y., Singavarapu, B., Paxton, R.J. and Wubet, T., 2022. *Science of The Total Environment*, 849, p.157941.
- [Toxic temperatures: Bee behaviors exhibit divergent pesticide toxicity relationships with warming.](#) Kenna, D., Graystock, P. and Gill, R.J., 2023. *Global Change Biology*.
- [Characterization of Sulfoxaflor and Its Metabolites on Survival, Growth, Reproduction, Biochemical Markers, and Transcription of Genes of \*Daphnia magna\*.](#) Yuan, T., Jiao, H., Ai, L., Chen, Y., Hu, D. and Lu, P., 2023. *Journal of Agricultural and Food Chemistry*, 71(16), pp.6424-6433.
- [Field-realistic exposure to neonicotinoid and sulfoximine insecticides impairs visual and olfactory learning and memory in \*Polistes\* paper wasps.](#) Fiona E. Corcoran, Elizabeth A. Tibbetts; Field-realistic exposure to neonicotinoid and sulfoximine insecticides impairs visual and olfactory learning and memory in *Polistes* paper wasps. *J Exp Biol* 15 November 2023; 226 (22): jeb246083. doi: <https://doi.org/10.1242/jeb.246083>
- [Chronic exposure to insecticides impairs honeybee optomotor behaviour.](#) Parkinson, R., Fecher, C. and Gray, J. (2022) Chronic exposure to insecticides impairs honeybee optomotor behaviour, *Frontiers in Insect Science*. Available at: <https://www.frontiersin.org/journals/insect-science/articles/10.3389/finsc.2022.936826/full>
- [Assessment of acute and chronic toxicity of cyantraniliprole and sulfoxaflor on honey bee \(\*Apis mellifera\*\) larvae.](#) Kim, J., Chon, K., Kim, B. S., Oh, J. A., Yoon, C. Y., & Park, H. H. (2022). Assessment of acute and chronic toxicity of cyantraniliprole and sulfoxaflor on honey bee (*Apis mellifera*) larvae. *Pest management science*, 78(12), 5402–5412. <https://doi.org/10.1002/ps.7162>
- [Romance in peril: A common pesticide impairs mating behaviours and male fertility of solitary bees \(\*Osmia bicornis\*\).](#) Vélez-Trujillo, L. et al. (2025) Romance in peril: A common pesticide impairs mating behaviours and male fertility of solitary bees (*Osmia bicornis*), *Chemosphere*. Available at: <https://www.sciencedirect.com/science/article/pii/S0045653525002772>.
- [Effects of chronic exposure to the new insecticide sulfoxaflor in combination with a SDHI fungicide in a solitary bee.](#) Azpiazu, Celeste & Bosch, Jordi & Martins, Cátia & Sgolastra, Fabio. (2022). Effects of the Chronic Exposure to the New Insecticide Sulfoxaflor in Combination with an Sdhi Fungicide in a Solitary Bee. *SSRN Electronic Journal*. 10.2139/ssrn.4066170.
- [Do novel insecticides pose a threat to beneficial insects?](#) Siviter Harry and Muth Felicity 2020 Do novel insecticides pose a threat to beneficial insects? *Proc. R. Soc.* B.28720201265 <http://doi.org/10.1098/rspb.2020.1265>
- [Survival rate and changes in foraging performances of solitary bees exposed to a novel insecticide.](#) Boff, S., Scheiner, R., Raizer, J., & Lupi, D. (2021). Survival rate and changes in foraging performances of solitary bees exposed to a novel insecticide. *Ecotoxicology and environmental safety*, 211, 111869. <https://doi.org/10.1016/j.ecoenv.2020.111869>
- [Comparing the Acute Toxicity of Imidacloprid with Alternative Systemic Insecticides in the Aquatic Insect \*Chironomus dilutus\*.](#) Erin M. Maloney, Hunter Sykes, Christy Morrissey, Kerry M. Peru, John V. Headley, Karsten Liber, Comparing the Acute Toxicity of Imidacloprid with Alternative Systemic Insecticides in the Aquatic Insect *Chironomus dilutus*, *Environmental Toxicology and Chemistry*, Volume 39, Issue 3, 1 March 2020, Pages 587–594, <https://doi.org/10.1002/etc.4639>
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mitochondrial energy production in *Chironomus kiinensis*. *Aquatic Toxicology*. 235. 105822. 10.1016/j.aquatox.2021.105822.

- [Toxicity of the insecticide sulfoxaflor alone and in combination with the fungicide fluxapyroxad in three bee species](#). Azpiazu, C., Bosch, J., Bortolotti, L. et al. Toxicity of the insecticide sulfoxaflor alone and in combination with the fungicide fluxapyroxad in three bee species. *Sci Rep* 11, 6821 (2021). <https://doi.org/10.1038/s41598-021-86036-1>
- [The sulfoximine insecticide sulfoxaflor exposure reduces the survival status and disrupts the intestinal metabolism of the honeybee \*Apis mellifera\*](#). Cheng, S., Dai, P., Li, R., Chen, Z., Liang, P., Xie, X., Zhen, C., & Gao, X. (2023). The sulfoximine insecticide sulfoxaflor exposure reduces the survival status and disrupts the intestinal metabolism of the honeybee *Apis mellifera*. *Journal of hazardous materials*, 442, 130109. <https://doi.org/10.1016/j.jhazmat.2022.130109>
- [Sulfoxaflor exposure reduces bumblebee reproductive success](#). Siviter, H., Brown, M.J.F. & Leadbeater, E. Sulfoxaflor exposure reduces bumblebee reproductive success. *Nature* 561, 109–112 (2018). <https://doi.org/10.1038/s41586-018-0430-6>
- [Fungicide and insecticide exposure adversely impacts bumblebees and pollination services under semi-field conditions](#). Tamburini, G., Pereira-Peixoto, M. H., Borth, J., Lotz, S., Wintermantel, D., Allan, M. J., Dean, R., Schwarz, J. M., Knauer, A., Albrecht, M., & Klein, A. M. (2021). Fungicide and insecticide exposure adversely impacts bumblebees and pollination services under semi-field conditions. *Environment international*, 157, 106813. <https://doi.org/10.1016/j.envint.2021.106813>
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- [Field rates of Sivanto™ \(flupyradifurone\) and Transform® \(sulfoxaflor\) increase oxidative stress and induce apoptosis in honey bees \(\*Apis mellifera\* L.\)](#). Chakrabarti P, Carlson EA, Lucas HM, Melathopoulos AP, Sagili RR (2020) Field rates of Sivanto™ (flupyradifurone) and Transform® (sulfoxaflor) increase oxidative stress and induce apoptosis in honey bees (*Apis mellifera* L.). *PLOS ONE* 15(5): e0233033. <https://doi.org/10.1371/journal.pone.0233033>
- [Sulfoxaflor influences the biochemical and histological changes on honeybees \(\*Apis mellifera\* L.\)](#). Ibrahim, ED.S., Abd Alla, A.E., El-Masarawy, M.S. et al. Sulfoxaflor influences the biochemical and histological changes on honeybees (*Apis mellifera* L.). *Ecotoxicology* 32, 674–681 (2023). <https://doi.org/10.1007/s10646-023-02677-0>
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## Gateway Health and Environmental Effects Citations

1. US EPA, Office of Prevention, Pesticides and Toxic Substances, Reregistration Eligibility Decisions (REDs), Interim REDs (iREDs) and RED Factsheets.

<https://archive.epa.gov/pesticides/reregistration/web/html/status.html>.

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