Oxya chinensis Datasheet

Figure 1. Adult *Oxya chinensis* (Photo courtesy of Charles J. Sharp, Sharp Photography, CC BY-SA 4.0).

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Scientific Name
Oxya chinensis (Thunberg, 1815)

Synonym(s):
Gryllus chinensis Thunberg, 1815
Gryllus lutescens Thunberg, 1815

Common Name
Chinese rice grasshopper

Type of Pest
Grasshopper

Taxonomic Position
Class: Insecta, **Order:** Orthoptera, **Family:** Acrididae

Pest Description
With some training, surveyors can differentiate Acrididae from other grasshoppers by the short antennae, oval tympanum on the first abdominal segment, three segmented tarsi (feet), and short ovipositor in females (Pfadt, 2002). However, field recognition to species can be difficult and require specialized taxonomic expertise.

Adults are green, yellowish-green, or yellowish-brown with gray eyes and brown longitudinal bands extending dorsally from the eyes through the dorsal surface of the pronotum (upper surface of the first segment of the thorax) to the base of the wings, and posteriorly along the tegmina (forewings) (Chen, 1999) (Fig. 1). The sides of the abdomen are brown, the hind femurs exhibit brown tips, and the hind tibia is bluish (Dale, 1994; Huang et al., 2018; Liu and Li, 1933). Adult body length is about $^{11}/_{16}$ to 1 $^{3}/_{16}$ in. for males and $^{13}/_{16}$ to 1 $^{3}/_{8}$ in. for females (Dale, 1994; Guo et al., 2001; Huang et al., 2018; Khan et al., 2016; Li et al., 2011). Adults may be found feeding on the leaves, branches, and shoots of rice and other host plants (Cuong et al., 2022; Li et al., 1993; Liu and Li, 1933).

Nymphs are green. Wing buds start to develop in the third instar and expand to about 1 $^{1}/_{4}$ in. long (i.e., up to the third abdominal segment) in the sixth instar (Liu and Li, 1933; Shen et al., 1988). They appear similar to adults except for the lack of fully developed wings and smaller body size (Adria and Idris, 1990; Shen et al., 1988). In rice, nymphs are commonly found feeding on the leaves of seedlings (Wu et al., 2011).

Eggs are transparent yellow and 3 to 4 mm long when initially laid (Liu and Li, 1933; Mandras and Gapasin, 1979). Seven days after oviposition, the egg diameter doubles in size and the color changes to whitish-yellow. Just before hatching, eggs are grayish to

nearly black (Mandras and Gapasin, 1979). Eggs are laid in masses of 24 to 74 eggs that are contained within an egg pod (Dale, 1994; Sun et al., 1991). Since egg masses are laid below the soil surface typically near field margins, surveyors are unlikely to encounter them. If the field is flooded, eggs are laid in petioles, stems, and leaf folds above the water level (Dale, 1994; Liu and Li, 1933).

Signs

In rice, damage may be observed as irregular notches on leaves, consumption of the entire stem or leaf, grain yield loss, or damage to grains (Fig. 2) (Cuong et al., 2022; Dale, 1994; Li et al., 1993; Liu and Li, 1933; Sun et al., 1991). From flowering to grain maturity, grasshoppers will chew through the stem near the base of the panicle causing rice ears to wither (Dale, 1994; Liu and Li, 1933; Wu et al., 2017).

In other grass hosts, including sugarcane, they likely cause similar feeding damage (i.e., notches) but descriptions are scarce. Small holes on leaf margins have been observed in some broadleaf hosts such as patchouli (Adria and Idris, 1990) and tea (Min, 2020).

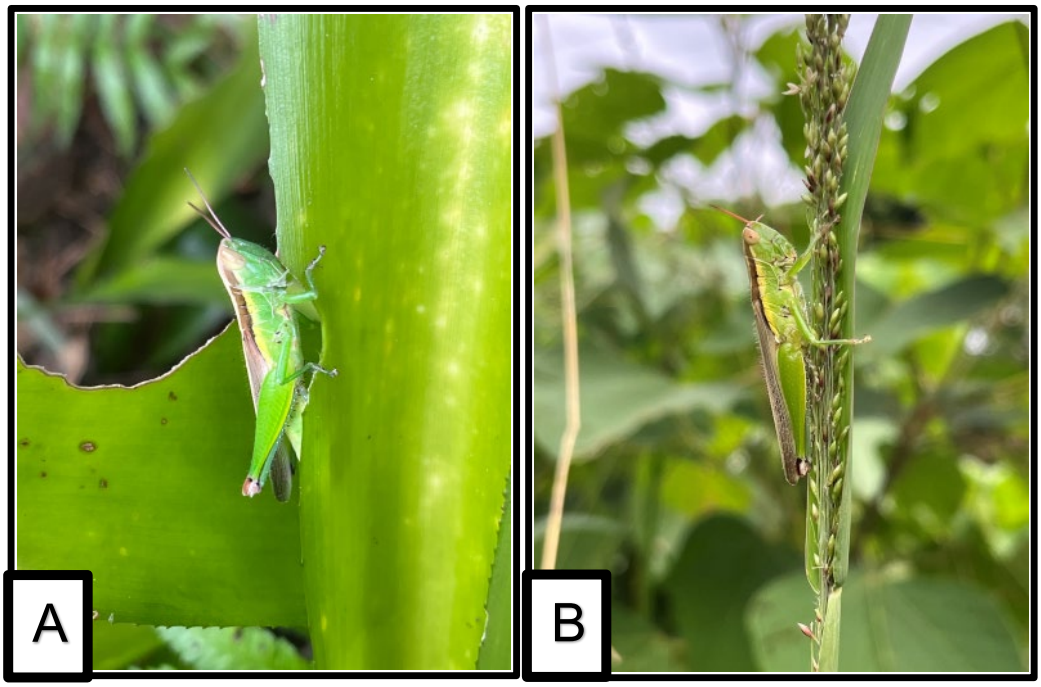

Figure 2. *Oxya chinensis* on a host leaf **(A)** and panicle **(B)** (Photos courtesy of Nakatada Wachi, inaturalist.org CC BY-NC 4.0).

Survey

Note that sweep net sampling may damage crops, especially flowers and fruits, and permission should be granted by landowners before sweep net sampling.

Surveys should take place in rice paddies and sugarcane fields from spring to early fall, when the presence of nymphs/adults is likely (Li et al., 1993; Wang et al., 2007). Other hosts may also be surveyed, especially in the vicinity of known populations. To survey for *O. chinensis* visually, surveyors can walk through survey sites and look for jumping adults and nymphs. If adults and nymphs are observed, use nets to collect specimens for screening and identification.

To survey for *O. chinensis* using a sweep net, surveyors can sweep over quadrats of a specified size (e.g., 6 ft × 6 ft.) (Shen et al., 1988) or along transects while walking within the survey site (UT Crops, 2026). Surveyors should focus their efforts along field margins, which are easier to access and more likely to have higher numbers of *O. chinensis*, especially early in the growing season (Wang et al., 2007). Sweep netting should ideally occur during the day when *O. chinensis* is most active (Leksono et al., 2022). Avoid sweep netting during wet conditions, as water will make maneuvering the net difficult (UT Crops, 2026).

Collected specimens can be euthanized by immersing them in ethyl or isopropyl alcohol for 2 to 3 minutes and then transferred to a jar lined with absorbent paper. If storing for more than 3 days, place the jar in a deep freezer.

Related Species in the United States

The American grasshopper (*Schistocerca americana*) is an occasional serious pest of sugarcane in Florida (Capinera and Squitier, 1996; Nuessly et al., 2019) and is present across the southeast and north to Iowa and Pennsylvania (Capinera and Squitier, 1996). Another grasshopper species that surveyors are likely to encounter is the differential grasshopper, *Melanoplus differentialis* (Thomas), which may be found throughout the United States with larger populations between the Rocky Mountains and Mississippi River (Pfadt, 1994). However, both species look different from *O. chinensis*. The adult *S. americana* (Fig. 3) is typically pinkish-brown to reddish-brown, becoming more yellowish as it reaches sexual maturity (Capinera and Squitier, 1996) and has wings with large brown spots on a lighter background (Capinera and Squitier, 1996). The adult *M. differentialis* (Fig. 4) is yellow with conspicuous black markings on the hind femur (Pfadt, 1994).

Figure 3. *Schistocerca americana* adult (Photo courtesy of Tom Friedel, wikipedia.org CC BY 3.0)

Figure 4. *Melanoplus differentialis* adult (Photo courtesy of Victor W. Fazio III, inaturalist.org CC BY-NC-ND)

Biology and Ecology

Oxya chinensis has one generation per year in India and northern China (Dale, 1994; Liu et al., 1997; Shen et al., 1988), but can have two generations per year in southern China (Huang et al., 2018; Wang et al., 2007; Zhu et al., 2009). In Xinjiang province (China), the life cycle begins when females lay eggs in masses in late August (Shen et al., 1988). The egg stage enters diapause, which allows *O. chinensis* to survive the winter (Kawano and Ando, 1997; Shen et al., 1988; Zhu et al., 2009). In Zhejiang province (China), eggs hatch in April to mid-May of the following year. After hatching, nymphs start feeding on leaves. Nymphs generally go through six instars, although females can have seven. The nymphal

stage occurs in June and adults emerge in mid to late July (Chen, 1999; Wang et al., 2007). After emergence, adults feed on leaves, stems, and shoots in paddy fields (Cuong et al., 2022; Dale, 1994; Li et al., 1993). They mate starting 15 to 30 days after emergence (Sun et al., 1991). Adult females produce up to about 130 eggs in their lifetime (in 1 to 7 egg masses with 24 to 74 eggs per mass) (Mandras and Gapasin, 1979; Sun et al., 1991). Adults live for up to 59 to 113 days, with longer lifespans in females (Li et al., 1993; Shen et al., 1988), before dying off in early fall (late-September to late-October in Henan province, northern China) (Liu et al., 1997). The entire life cycle, from egg to adult, takes 90 to 97 days excluding the overwintering period (Shen et al., 1988), while the overwintering period likely lasts from mid to late fall to early May (i.e., approximately 5 to 6 months) (Liu et al., 1997; Zhu et al., 2009). In India, *O. chinensis* is abundant from August to November (Dangar et al., 1998).

The environment, including temperature and humidity, strongly influence *O. chinensis* development (Shen et al., 1988); however, specific degree-day models and lethal temperature thresholds have not yet been determined for this species. Outbreaks generally occur in dry years with a warmer winter (Shen et al., 1988).

Known Hosts

Preferred hosts

Oxya chinensis primarily feeds on rice (*Oryza sativa*) (Li et al., 1993; Wang et al., 2007) and sugarcane (*Saccharum* spp.) (Huang et al., 2018; Pemberton, 1933; Pemberton, 1964).

Other hosts

Arecaceae: *Arenga pinnata* (sugar palm) (Herlin et al., 2023); **Asteraceae**: *Zinnia* spp. (zinnias) (Herlinda et al., 2019); **Brassicaceae**: *Brassica juncea* subsp. *integrifolia* var. *rugosa* (wrapped heart mustard) (van Wijk, 2006); **Cucurbitaceae**: *Benincasa hispida* (wax gourd) (van Wijk, 2006); **Fabaceae**: *Glycine max* (soybean) (Asri and Ratnasari, 2020); **Lamiaceae**: *Pogostemon cablin* (patchouli) (Adria and Idris, 1990); **Orchidaceae**: *Spathoglottis* spp. (garden orchids) (Kumari and Lyla, 2001); **Poaceae**: *Zea mays* (corn) (Nurkomar et al., 2020; Sari et al., 2023); **Solanaceae**: *Capsicum annuum* (bell pepper) (Bait et al., 2022; Suprapti et al., 2022); **Theaceae**: *Camellia sinensis* (tea) (Min, 2020).

This grasshopper has also been reported to feed on sweet potato, beans, cotton, millet, peanuts, pineapple, sorghum, *Isachne miliaceae*, *Cyperus rotundus*, *Alternanthera philoxeroides*, and *Phragmites comunis* (Cuong et al., 2022; Dangar et al., 1998; Huang et al., 2018; Illingworth, 1929; Liu et al., 2022; Varughese, 1996); however, these records have not been confirmed.

Known Distribution

Oxya chinensis is distributed in parts of central and southern Asia, including China, India, Indonesia, Japan, Pakistan, the Korean peninsula, and most of Southeast Asia (Kim et al., 2006; Sami et al., 2010).

Status of infestation in the United States (July 2026)

Several *O. chinensis* adults were collected in New Jersey from non-rice grass hosts in 2023, 2024, and 2025 and confirmed by PPQ. The grasshopper was introduced to Hawai'i around 1900 (Pemberton, 1933), and is likely still present there (Simpson et al., 2023).

Pest Importance

Oxya chinensis is described as an important pest of rice that causes damage primarily to seedlings in nurseries (Chen, 1999). Although infestations generally occur every year, severe outbreaks are most likely sporadic. Generally, this pest causes 10 to 20% loss in rice (Sun et al., 1991; Wu et al., 2017), but losses up to 30 to 50% may occur depending on the population size (Wang et al., 2007). However, *O. chinensis* is only a minor pest in some areas (i.e., parts of India, Hawai'i) (Dangar et al., 1998; Herlinda et al., 2019; Swezey, 1931; Thakur, 1984), with occasional outbreaks under suitable environmental conditions (Dale, 1994). It is a minor pest of some hosts such as pineapple (Illingworth, 1929; Petty et al., 2002) and occasional damage has been reported in sugarcane (Huang et al., 2018; Sami et al., 2010).

Oxya chinensis has been reported on several environmental hosts, including zinnia (Herlinda et al., 2019) and sugar palm (Arenga pinnata) (Herlin et al., 2023). It can also be found in grasslands (Miao et al., 2018; Phimphan et al., 2017). Additionally, this pest is an intermediate host of avian worm parasites (helminths), including *Subulura brumpti* and *Cheilospirura hamulosa* (Alicata, 1947; Schwartz and Schwartz, 1951), with *C. hamulosa* having implications in public health (Ebrahimi et al., 2015).

Currently, no countries list *O. chinesis* as a harmful organism (USDA-APHIS, 2026), suggesting trade implications may be minimal if this pest becomes established in the United States.

Pathway

Oxya chinensis has likely been present in Hawai'i since the late 19th century, likely introduced as egg pods in soil accompanying imported plants from Asia (Pemberton, 1933; Pemberton, 1964).

Adults of *O. chinensis* have been described as having strong flight capabilities (Huang et al., 2018; Sun et al., 1991). Further, *Oxya* grasshoppers can migrate to a new location and have "great mobility" (Sultana et al., 2012). Additionally, according to one study, the

macropterous (long-winged) form of rice grasshoppers can fly over 6 miles, suggesting adults are capable of naturally dispersing long distances by flight (Hashizume and Hironaka, 2019).

In countries such as South Korea and Thailand, certain food products containing *O. chinensis* are commercially available, suggesting that this pest could be introduced into new areas as a protein source for human consumption (Kim et al., 2019).

Potential Distribution within the United States

Using global Plant Hardiness Zone (PHZ) maps (SAFARIS, 2026) to compare domestic PHZs with the pest's reported global distribution, this species is most likely to establish in PHZs 5 to 13, which corresponds to the majority of the continental United States as well as Hawai'i and Puerto Rico (Fig. 5). Host availability is unlikely to limit establishment since the grasshopper has been found feeding on a variety of grass and broadleaf hosts.

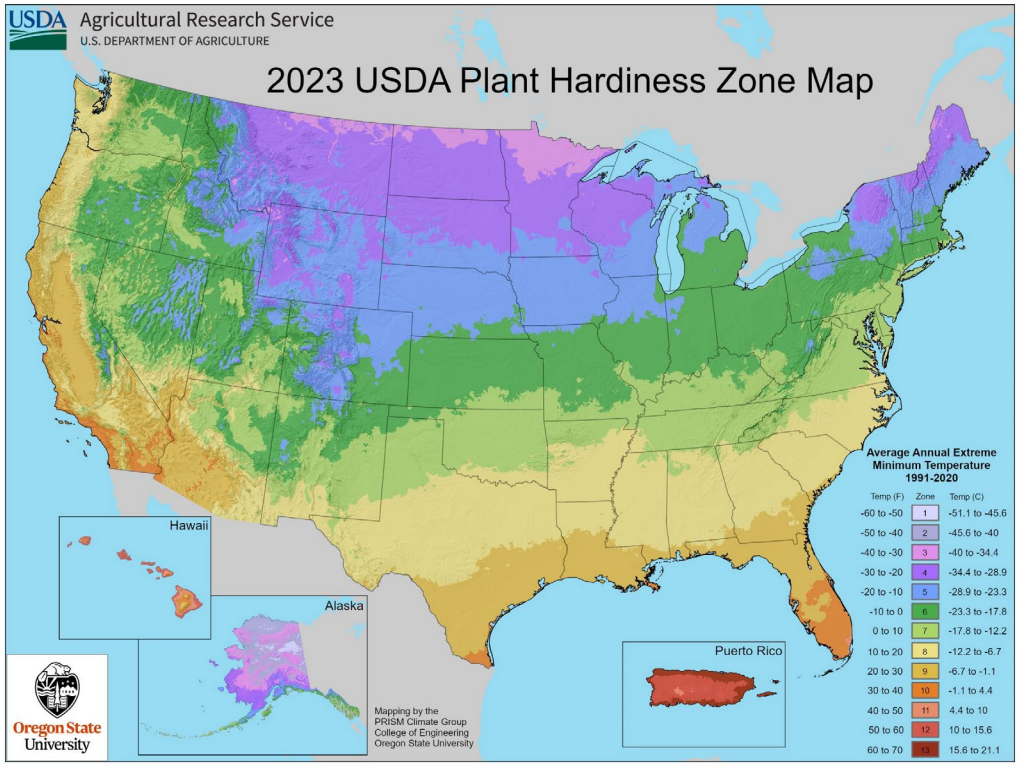

Figure 5. USDA Plant hardiness Zone map

References

Adria, J.H.Z. and Idris, H., 1990. Beberapa jenis hama perusak daun tanaman nilam (Pogostemon cablin, Benth) [Several types of leaf-damaging pests of patchouli plants (Pogostemon cablin, Benth)]. Pemberitaan Penelitian Tanaman Industri, 16(2): 59–64.

Alicata, J.E., 1947. Parasites and parasitic diseases of domestic animals in the Hawaiian Islands. Pacific Science, 1: 69–84.

Asri, M.T. and Ratnasari, E.W., 2020. The combination effect of Spodoptera litura Multicaspid Nuclear Polyhedrosis Virus, Lecanicillium lecanii, and neem seed extract to soybean pests and predators in East Java agroecosystem. Biopesticides International, 16(2): 141–148.

Bait, R.I., Sayuthi, M. and Pramayudi, N., 2022. The effect of refugia plant types on diversity of herbivorous insects of the order Orthoptera in cultivation of red chili (Capsicum annum L.). Jurnal Ilmiah Mahasiswa Pertanian, 7(1): 737–748.

Capinera, J.L. and Squitier, J.M., 1996. American grasshopper, Schistocerca americana (Drury) (Insecta: Orthoptera: Acrididae), University of Florida, Gainesville, Florida. https://ask.ifas.ufl.edu/publication/IN130.

Chen, Y.-l., 1999. The locust and grasshopper pests of China. China Forestry Publishing House, Beijing, China, 72 pp.

Cuong, L.C.V., Souvannalath, B., Ha, T.P., Lien, L.Q., Tam, V.T.T. and Hoai, P.T.T., 2022. Isolation and screening of entomopathogenic fungi against the grasshopper *Oxya chinensis* (Orthoptera: Acrididae) from rice fields in Thua Thien Hue, Vietnam. Biodiversitas, 23(9): 4906–4911.

Dale, D., 1994. Insect pests of the rice plant - Their biology and ecology. In: E.A. Heinrichs (Editor), Biology and management of rice insects. Wiley Eastern Limited, London, U.K., pp. 363–485.

Dangar, T.K., Rao, J., Panigrahi, D., Jha, S. and Rath, P.C., 1998. Rice grasshoppers, mole cricket and termites, Insect Pests of Cereals and their Management, pp. 111–119.

Ebrahimi, M., Rouhani, S., Mobedi, I., Rostami, A., Khazan, H. and Ahoo, M.B., 2015. Prevalence and morphological characterization of Cheilospirura hamulosa, Diesing, 1861 (Nematoda: Acuarioidea), from partridges in Iran. Journal of Parasitology Research, 2015: 569340.

Guo, Y., Hao, D.Y., Rong, B.G. and Bo, M.E., 2001. Lack of chromosomal polymorphism among *Oxya chinensis* populations of different body size in China [Abstract]. Acta Zoologica Sinica, 47: 23–29.

Hashizume, K. and Hironaka, M., 2019. Distribution and swarm flights of grasshoppers in the genus Oxya (Orthoptera: Acrididae) in Ishikawa Prefecture, Japan. Proceeding of the Association for Plant Protection of Hokuriku, 68: 21–30.

Herlin, W., Apriani, R., Maulana, A. and Wesley, R., 2023. Sugar palm (Arenga pinnata) plantations in the Ogan Komering Ilir, Ogan Ilir, and Musi Banyuasin Districts: Insect diversity in weeds. In: S.H.e.a. (Eds.) (Editor), Proceedings of the 11th National Seminar on Suboptimal Land Palembang, pp. 523–541.

Herlinda, S., Karenina, T., Irsan, C. and Pujiastuti, Y., 2019. Arthropods inhabiting flowering non-crop plants and adaptive vegetables planted around paddy fields of freshwater swamps of South Sumatra, Indonesia. Biodiversitas, 20(11): 3328–3339.

Huang, Y.K., Li, W.F., Zhang, R.Y. and Wang, X.Y., 2018. Color illustration of diagnosis and control for modern sugarcane diseases, pests, and weeds. China Agriculture Press, Springer Nature Singapore, 420 pp.
Illingworth, J.F., 1929. Pests of pineapple in Hawaii. Proceedings of the Hawaiian Entomological Society, 7(2): 254–256.
Jrap, 2021. Chinese rice grasshopper (*Oxya chinensis*). iNaturalist observation.
Kawano, S. and Ando, Y., 1997. Effects of photoperiod on nymphal development, pre-oviposition period and egg diapause in the subtropical rice grasshopper, *Oxya chinensis formosana* Shiraki (Orthoptera: Catantopidae). Applied Entomology and Zoology, 32(3): 465–470.
Khan, M.I., Usmani, M.K. and Usmani, S., 2016. Studies on the taxonomy of Oxyinae (Orthoptera: Acridoidea: Acrididae) from North-Eastern states of India. Munis Entomology & Zoology, 11(1): 202–218.
Kim, S.T., Jung, M.P., Kim, H.S., Shin, J.H., Lim, J.H. and Kim, T.W., 2006. Insect fauna of adjacent areas of DMZ in Korea. Journal of Ecology and Environment, 29(2): 125–141.
Kim, S.Y., Kim, M.J., Jung, S.K. and Kim, H.Y., 2019. Development of a fast real-time PCR assay based on TaqMan probe for identification of edible rice grasshopper (*Oxya chinensis*) in processed food products. Food Research International, 116: 441–446.
Kumari, S. and Lyla, K.R., 2001. A survey of the pests of orchids. Journal of Tropical Agriculture, 39: 32–34.
Leksono, A.S., Yanuwiadi, B., Khotimah, A. and Zairina, A., 2022. Grasshopper diversity in several agricultural areas and savannas in Dompu, Sumbawa Island, Indonesia. Biodiversitas, 23(1): 75–80.
Li, B., Wang, G., Qi, J., Wang, Z., Chen, G., Wang, Z., Ma, X., Yu, K., Li, B. and Liu, G., 1993. Discussion of the damage caused by *Oxya chinensis* (Thunberg) and a control index. Entomological Knowledge, 30(4): 193–195.
Li, T., Ma, J., Zhang, M., Zhang, J.Z., Guo, Y.P. and Ma, E.B., 2011. Biogeography analysis of *Oxya chinensis* based on morphological characters from different geographical populations. Acta Zootaxonomica Sinica, 36(1): 125–131.
Liu, C.-y. and Li, S.-s., 1933. Some preliminary notes on the life history of the rice grasshopper, *Oxya chinensis* Thunberg. Yearbook of the Bureau of Entomology of Chekiang Province, 2: 59–70.
Liu, Z., Gao, S.S., Zhang, L.Q. and Lou, H.Y., 1997. Study on the biology and control of the Chinese rice grasshopper. Entomological Knowledge, 34(4): 195–197.
Liu, Z., Yu, H., Sun, X. and Ding, J., 2022. Effects of elevated temperature on chemistry of an invasive plant, its native congener and their herbivores. Journal of Plant Ecology, 15(3): 450–460.
Mandras, B.T. and Gapasin, D.P., 1979. Biology and host range of the Chinese grasshopper, *Oxya chinensis* Thunberg. Annals of Tropical Research, 1: 35–44.
Miao, H.T., Liu, Y., Shan, L.Y. and Wu, G.L., 2018. Linkages of plant-soil interface habitat and grasshopper occurrence of typical grassland ecosystem. Ecological Indicators, 90: 324–333.
Min, W.W., 2020. Insect pests and their damage on tea plants in Myanmar. International Journal of Zoology and Applied Biosciences, 5(2): 105–110.
Nuessly, G.S., Cherry, R.H., Sandhu, H.S. and Beuzelin, J.M., 2019. Miscellaneous insect pests of Florida sugarcane, University of Florida, Institute of Food and Agricultural Sciences Extension.

Nurkomar, I., Setiawan, A.N., Khomeri, F. and Genesiska, 2020. Potential pest of high amylopectin and rich anthocyanin corn varieties, Second International Conference on Sustainable Agriculture. IOP Conference Series: Earth and Environmental Science, pp. 9.

Pemberton, C.E., 1933. Introduction to Hawaii of Malayan parasites (Scelionidae) of the Chinese grasshopper *Oxya chinensis* (Thun.) with life history notes. Proceedings of the Hawaiian Entomological Society, 8(2): 253–264.

Pemberton, C.E., 1964. Highlights in the history of entomology in Hawaii 1778-1963. Pacific Insects, 6(4): 689–729.

Petty, G.J., Stirling, G.R. and Bartholomew, D.P., 2002. Pests of Pineapple. In: J.L.S. J. E. Peña, & M. Wysoki (Editor), Tropical fruit pests and pollinators: Biology, economic importance, natural enemies and control. CABI Publishing, Wallingford, UK, pp. 157–195.

Pfadt, R.E., 1994. Common western grasshoppers - Melanoplus differentialis, Wyoming Agricultural Experiment Station, University of Wyoming.

Pfadt, R.E., 2002. Field guide to common western grasshoppers, 912. Wyoming Agricultural Experiment Station, Wyoming, USA.

Phimphan, S., Sangpakdee, W., Sangpakdee, K. and Tanomtong, A., 2017. Chromosomal analysis and meiosis studies of *Oxya chinensis* (Orthoptera: Acrididae) from Thailand. Nucleus, 60: 9–15.

SAFARIS, 2026. Global Plant Hardiness Zones, Spatial Analytic Framework for Advanced Risk Information Systems (SAFARIS). United States Department of Agriculture (USDA) and North Carolina State University (NCSU), Raleigh, NC, USA https://safaris.cipm.info.

Sami, A.J., Tabassum, F. and Shakoori, A.R., 2010. Biodegradation of cellulose and xylan by a paddy pest, *Oxya chinensis*. Annals of Biological Research, 1(3): 1–12.

Sari, S.P., Suliansyah, I., Nelly, N., Hamid, H. and Dwipa, I., 2023. Corn pests and evaluation of the implementation of integrated pest management in West Sumatra, Indonesia. International Journal on Advanced Science Engineering Information Technology, 13(1): 91–96.

Schwartz, C.W. and Schwartz, E.R., 1951. An ecological reconnaissance of the pheasants in Hawaii. The Auk, 68(3): 281–314.

Shen, C.Y., Lu, Z.C., Shen, B.F. and Huang, B.L., 1988. Research on the occurrence patterns and control of the Chinese rice grasshopper. Insect Knowledge, 25(3): 134–137.

Simpson, A., Sellers, E. and Pagad, S., 2023. Global Register of Introduced and Invasive Species–Hawaii, United States (ver. 2.0, 2022), Invasive Species Specialist Group ISSG. Checklist dataset

Sultana, R., Bughio, B.A., Ali, W. and Khan, H., 2012. Studies on the immature stages of *Oxya velox* (Fabricius) a rice grasshopper from district Jamshoro, Sindh, Pakistan. FUUAST Journal of Biology, 2(1): 57.

Sun, R., Peng, Y. and Dong, Z., 1991. Pattern of occurrence and integrated control of *Oxya chinensis* (Thunberg). Insect Knowledge, 28(6): 30–33.

Suprapti, E., Budiyono, A., Dewi, T.S.K. and Daryanti, W.H.D., 2022. Inventory of pests and intensity of fruit fly attacks (*Bactrocera dorsalis*) on curly red chili plants (*Capsicum annum* L.) in Sido Luhur Farmer Group of Cabeyan Village. Jurnal Ilmiah Agrineca, 22(2): 75–87.

Swezey, O., 1931. Some recent parasite introductions in Hawaii. Journal of Economic

Entomology, 24(5): 945–947.
Thakur, N.S.A., 1984. Insect pests of rice in the Sikkim Hills. International Rice Research Newsletter, 9(6): 18.
USDA-APHIS, 2026. Phytosanitary Export Database (PExD). United States Department of Agriculture, Animal and Plant Health Inspection Service, Last accessed 4/28/2026 from: https://pcit.aphis.usda.gov/PExD/faces/harmfulOrganismReport.jsf.
UT Crops, 2026. Sweep net sampling. University of Tennessee, Institute of Agrilcuture, Last accessed 4/28/2026 from: https://utcrops.com/cotton/insects-and-mites/sweep-net-sampling/.
van Wijk, M.S., 2006. Sustainable technologies for pest, disease and soil fertility management in smallholder vegetable production in China and Vietnam (VEGSYS), Agricultural Economics Research Institute, The Hague, The Netherlands.
Varughese, A., 1996. Ecophysiology and management of Isachne in rice fields of Onattukara. Doctoral Thesis, Kerala Agricultural University, 204 pp.
Wang, H., Xu, Z., Feng, Z., Xu, F. and Wu, Y., 2007. The occurrence, damage and action threshold of Chinese rice grasshopper, *Oxya chinensis*, in rice field. Acta Phytophylacica Sinica, 34(3): 235–240.
Wu, H., Zhang, R., Liu, J., Guo, Y. and Ma, E., 2011. Effects of malathion and chlorpyrifos on acetylcholinesterase and antioxidant defense system in *Oxya chinensis* (Thunberg) (Orthoptera: Acrididae). Chemosphere, 83(4): 599–604.
Wu, H., Zhang, Y., Shi, X., Zhang, J. and Ma, E., 2017. Overexpression of Mn-superoxide dismutase in *Oxya chinensis* mediates increased malathion tolerance. Chemosphere, 181: 352–359.
Zhu, D.H., Yang, Y.P. and Liu, Z., 2009. Reversible change in embryonic diapause intensity by mild temperature in the Chinese rice grasshopper, *Oxya chinensis*. Entomologia Experimentalis et Applicata, 133(1): 1–8.