CAPS Datasheets provide pest-specific information to support planning and completing early detection surveys.

Chilo suppressalis

Figure 1. *Chilo suppressalis* adult (Photo courtesy of Todd Gilligan, Bugwood.org, CC BY-NC 3.0 US)

Scientific Name

Chilo suppressalis Walker, 1863

Synonym(s):
Chilo simplex Butler, 1880
Chilo oryzae Fletcher, 1926-1927

Common Name

Asiatic rice borer, striped rice stem borer, striped rice stalk borer, rice stem borer, rice chilo, purple-lined borer, rice borer, sugarcane moth borer, pale-headed striped borer, rice stalk borer

Type of Pest

Moth, borer

Taxonomic Position

Class: Insecta, **Order:** Lepidoptera, **Family:** Crambidae

Pest Recognition

This section describes characteristics of the organism and symptoms that will help surveyors recognize possible infestations/infections in the field, select survey sites, and collect symptomatic material. For morphological descriptions, see the Identification/Diagnostic resources on the AMPS pest page on the CAPS Resource and Collaboration website.

Pest Description

Adults: *Chilo suppressalis* are medium-sized moths (Fig. 1) with a wingspan of $^{4}/_{5}$-1$^{3}/_{16}$ in. The forewing coloration varies from dirty-white to yellow-brown, sprinkled with gray-brown scales, and the hindwings are white to yellowish-brown. Adult females are larger than males (Bleszynski, 1970; Hattori et al., 1986). Identification to species level is based on adult genitalia (Gilligan et al., 2014; Royals et al., 2017). Adults are active during the night and remain hidden on rice plants or nearby grasses during the day (Pathak et al., 1994).

Eggs: Eggs are scale-like, about 0.9 mm by 0.5 mm, turning from translucent white to dark yellow as they mature (Fig. 2A). Eggs are laid in batches, mainly on underside of leaves and occasionally on leaf sheaths (part of the leaf blade that wraps around the stem) (Fig. 4) (Rothschild, 1971; Xiang et al., 2023).

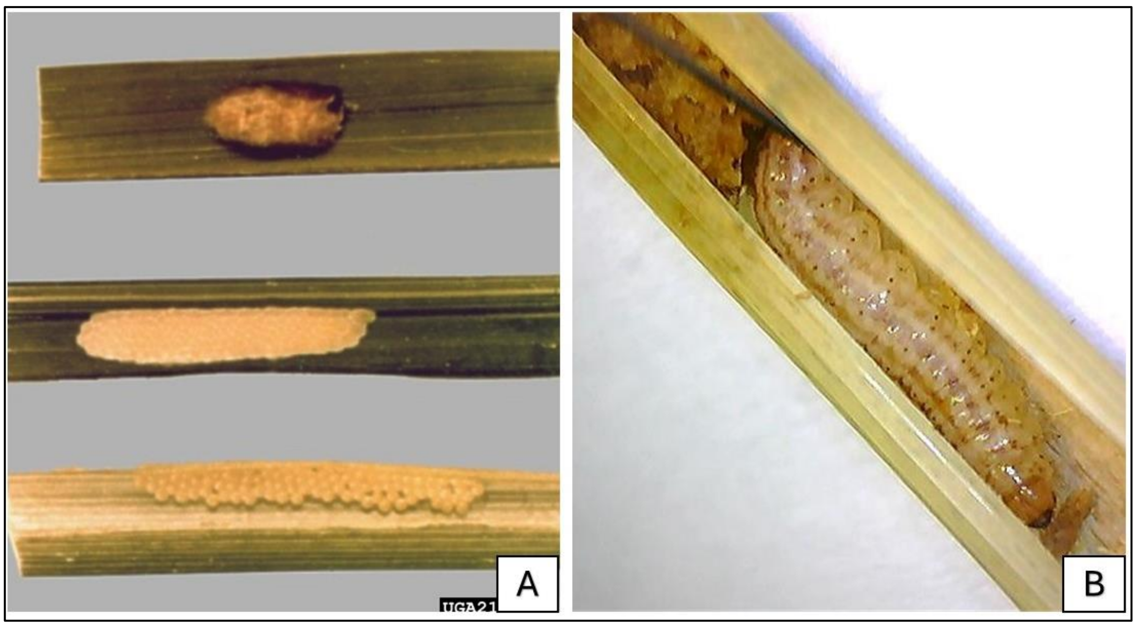

Figure 2. *Chilo suppressalis* (A) eggs and (B) larva (Photos courtesy of (A) International Rice Research Institute, Bugwood.org CC BY-NC 3.0 US; (B) Dr. Sandra Vacas González)

Larvae: The first larval instar is approximately 1.5 mm long with a black head and grayish-white body. The head of later larval instars lightens to brown. The last larval instar (Fig. 2B) is approximately $^{3}/_{4}$ to 1 in. long, tapered slightly toward each end, and is dirty white, with five longitudinal purple to brown stripes running down the back (Reissig et al., 1986). Earlier instars are found at the base of the leaf sheath (Fig. 4) and later instars are present inside the stem (Fig. 3A) (Pathak et al., 1994).

Pupae: Pupae are $^{1}/_{2}$-$^{7}/_{8}$ in. long, ~$^{1}/_{8}$ in. wide, and yellowish brown (Hattori et al., 1986). Pupation takes place inside the living stem (Fig. 3B), as well as straw or stubble (the dry rice stems left after harvest) (Fig. 4) (Pathak et al., 1994).

Figure 3. *Chilo suppressalis* (A) larva and pupa inside stem of rice plant and (B) pupa inside stem (Photo courtesy of Dr. Sandra Vacas González)

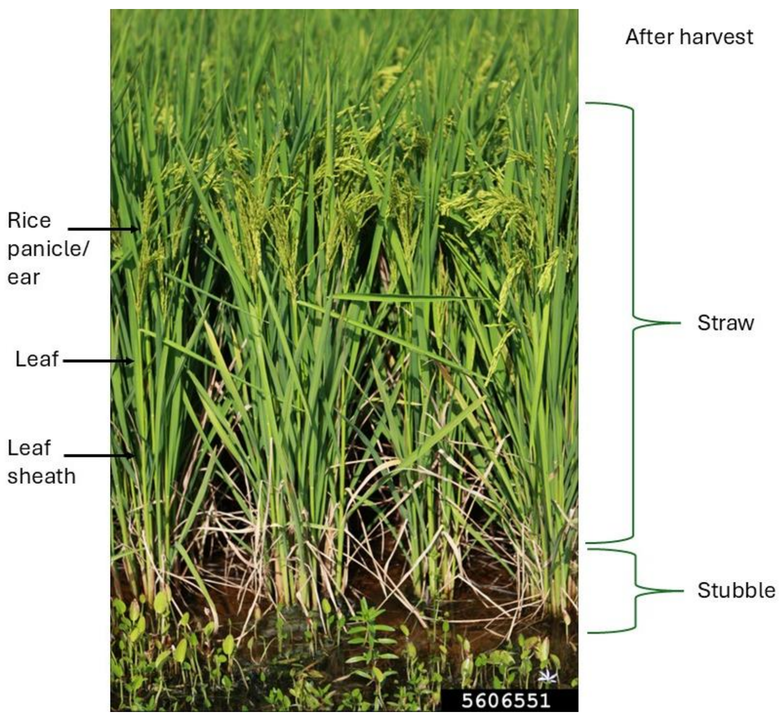

Figure 4. Rice plant (Photo courtesy of Gerald Holmes, IPM images.org CC BY-NC 3.0 US)

Symptoms:

Symptoms of infestation depend on when the damage occurs in the rice life cycle, which is briefly summarized here. During the vegetative stage, rice seedlings produce multiple stems (tillering) and grow taller. During the reproductive stage, plants develop flower heads (panicle initiation) that are first enclosed within a sheath (booting stage), then emerge from the sheath (heading stage), and produce flowers that are pollinated (flowering stage). After pollination, the rice grains fill and ripen, going through the 'milk', 'dough' and physiological maturity stages (Linscombe et al., 2010).

Larval feeding on the rice leaf sheath causes withering. Infested leaf sheaths first show transparent patches that later turn yellow brown and dry out. Larval boring and feeding around nodes leads to stunted seedlings in the tillering stage, shriveled ears during the booting stage, and pale panicles are visible at the tip of rice stem during the heading stage (Xiang et al., 2023). Larval feeding on rice stems kills the growing points of young shoots causing 'dead heart' symptoms (Fig. 5A). The presence of the pest also interferes with inflorescence development causing characteristic 'white head' symptoms (Fig. 5B). Infested plants bearing white heads have empty panicles or few grains (Catling et al., 1984). Stems weakened by the borers may also dislodge and fall. Circular exit holes are left on the stem when adults emerge from infested stems (Fig. 5C).

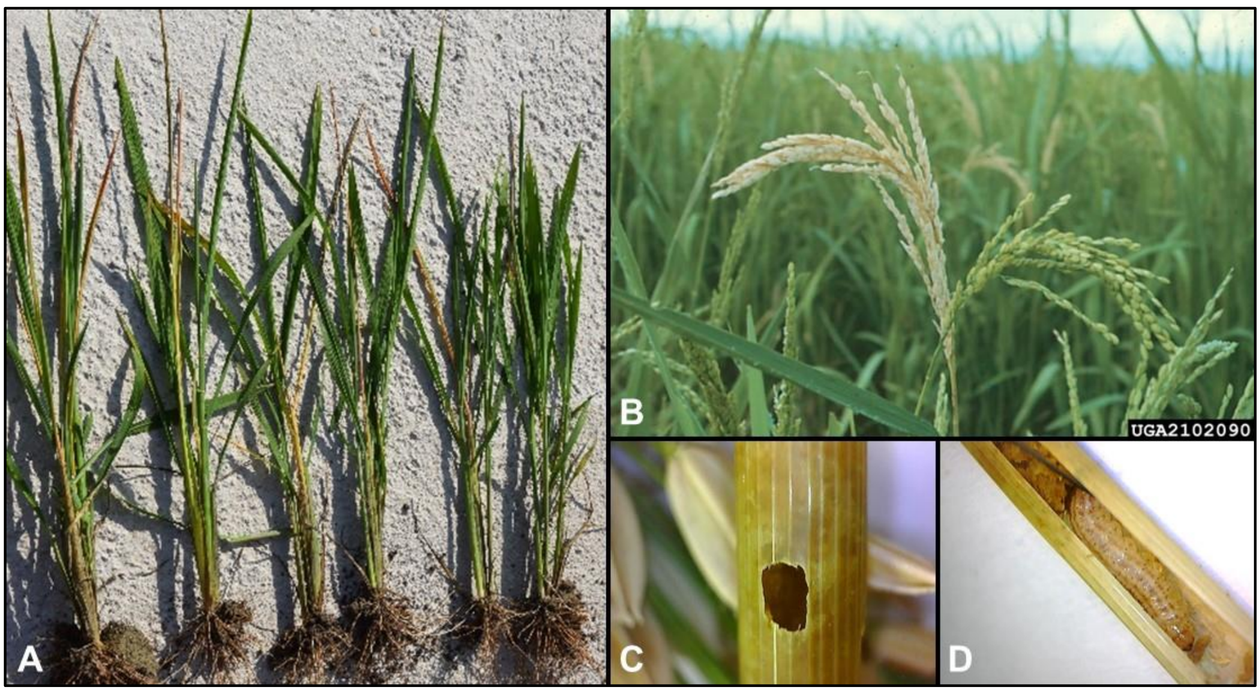

Figure 5. Damage due to *Chilo suppressalis*: (**A**) dead heart symptoms, (**B**) white head, (**C**) circular exit hole on the stem of rice plant, and (**D**) larvae inside rice stem (Photos courtesy of (A, C, D) Dr. Sandra Vacas González and (B) International Rice Research Institute, Bugwood.org CC BY-NC 3.0 US)

Easily Mistaken Species

Chilo suppressalis adults and larvae are easily mistaken for other species within the same genus.

Three *Chilo* species are present in the United States: *C. plejadellus, C. erianthalis* and *C. demotellus* (Fig. 6) (Heppner, 2007). *Chilo plejadellus* has a scattered distribution throughout the eastern, southern and midwestern United States and southeastern

Canada. This species is a minor pest of cultivated and wild rice (*Oryza sativa* and *Zizania* spp.) in Texas, Arkansas, Louisiana, Minnesota, Georgia, and northern Florida (Caballero, 1985; Mulcahy et al., 2022; Peterson et al., 1981; Roldán et al., 2020; Way et al., 2007). *Chilo erianthalis* is a pest of sugarcane and other Poaceae grasses but is not known on rice. This species has been reported from Louisiana, Georgia, and Florida (Capps, 1963; Durden et al., 2019; Heppner, 2007). *Chilo demotellus* is a pest reported in smooth cordgrass (*Sporobolus alterniflorus*) in Florida (Stiling et al., 1983). Genitalic dissection by a specialist is required to distinguish these three species from *C. suppressalis* (Royals et al., 2017).

Figure 6 *Chilo* species present in the United States: (left) *C. plejadellus*, (middle) *C. erianthalis,* and (right) *C. demotellus* (Source: Todd Gilligan, Screening Aids, USDA APHIS PPQ, Bugwood.org)

Chilo niponella and *C. christophi* are similar species that are not present in the United States. They are smaller and have a more distinct pattern on the forewings (Bleszynski, 1970).

Diatraea saccharalis (Fig. 7) is present in North America, attacks rice, sugarcane, and other members of the family Poaceae (Fogliata et al., 2016; Hamm et al., 2012; Joyce et al., 2014; Roe, 1981), and looks similar to *C. suppressalis*. These two species can be distinguished based on the presence/absence of ocelli (small, transparent lens or simple eyes) (Royals et al., 2017). *Diatraea saccharalis* is prevalent in the tropical and subtropical Americas, extending from Florida to southern Brazil and Uruguay (Dinardo-Miranda et al., 2012; Joyce et al., 2014).

Figure 7 Adult sugarcane borer, *Diatraea saccharalis* (Source: Todd Gilligan, Screening Aids, USDA APHIS PPQ, Bugwood.org)

Commonly Encountered Non-targets

The approved survey method is pheromone trapping using the *Chilo suppressalis* lure, which will attract many types of moths and other insects including ants, bees, beetles, and wasps (El-Sayed, 2024). *Chilo suppressalis* and other moths belonging to the subfamily Crambinae are morphologically similar, and genitalic dissection by a specialist may be necessary to identify to species. The presence of ocelli (transparent lens or simple eye) in *Chilo* can be used to separate them from *Diatraea* spp.

The following moths are attracted to one or more components of the lure blend and are present in the United States: *Agriphila straminella, Chrysoteuchia topiaria, Diatraea saccharalis, D. evanescens, D. grandiosella, D. lisetta, Eoreuma densella, Parapediasia teterrellus, Tehama bonifatella,* and *Xubida panalope* (El-Sayed, 2024; Gilligan et al., 2014). Note that these species have not been verified to be attracted to *Chilo suppressalis* pheromone traps and that non-targets encountered during CAPS surveys will vary by region.

Biology and Ecology

Adults are nocturnal and remain hidden in the lower part of the rice plant or hide among other neighboring plants during the day (Pathak et al., 1994). Flight and mating activities occur at night (Xiang et al., 2023). The female lays eggs over a 3-5 day period, in overlapping batches of 50-80 eggs, with a maximum reported fecundity of 550 eggs (Harris, 1990). The eggs are primarily laid at the base of the leaf, although some are laid near the leaf tip on the underside (Chen et al., 2014; Reissig et al., 1986).

After hatching, the early larval instars cluster and feed between the leaf sheaths and stems. It attacks the growing points, heads, leaves, panicles, sheaths, shoots, stems, and tillers of rice (Ebert, 1973; Hou et al., 2010). Some early larval instars may move to other plants by wind-aided dispersal. After the third instar, larvae bore into the stem; several larvae may feed together within a single internode, living in the moist pulp of chewed plant debris and frass. Mature larvae pupate inside the stem or between the leaf sheath and the stem, and adults emerge from exit holes (Xiang et al., 2023).

Chilo suppressalis is widespread in regions with different climatic conditions and it can tolerate a wide range of temperatures (Jiang et al., 2021). In the tropics on rice, normal development times are 6-7 days for eggs, 28-48 days for larvae, and 8-9 days for pupae (Ramoneda et al., 1993; Rothschild, 1971). The life cycle is completed in 35-50 days and adults live for about 4-6 days (Rothschild, 1971). *Chilo suppressalis* can reproduce continuously throughout the year in the tropics. In cooler temperate and subtropical areas, *C. suppressalis* has fewer generations per year (Gavara et al., 2021; Kiritani et al., 1967) and mature larvae enter diapause and overwinter in rice stubble in autumn (Pathak et al., 1994). Diapause is triggered when the photoperiod drops below 14 hours (Cho et al., 2005). The overwintering larvae of some populations are freeze tolerant and can survive exposure to -4˚F for 72 hours (Atapour et al., 2009). When the temperature and photoperiod increase in the next spring, the overwintering larvae pupate and emerge as adults.

The total egg-to-adult development time is estimated to require 748 degree days when using 48˚F, 48.5˚F, and 51˚F for the lower developmental thresholds for eggs, larvae, and pupae, respectively (SAFARIS, 2025).

The pest survives extremely high temperatures in all life stages, with eggs, larvae, and adults able to tolerate temperatures as high as 108˚F for several hours (Lu et al., 2014).

In temperate and subtropical areas, this pest has 1-3 generations per year (Han et al., 1982; Kishino, 1974; Lee, 2014), while tropical areas have 4-6 generations per year (Kiritani, 1990; Tsumuki et al., 1994). The timing of peak flight activity varies depending on the region and number of generations per year. Peak adult flight is observed in late July in areas having a single generation per year (Kishino, 1974). In areas with two generations, peak flight is in late May and in late August to early September (Han et al., 1982; Lee, 2014). In areas with three generations, peaks are observed in mid-May, mid-July, and late August (Kishino, 1974). In tropical areas lacking a diapausing stage (Kiritani, 1990), adults can be monitored throughout the year (Rothschild, 1971).

Known Hosts

The host list below includes cultivated and wild plants that 1) are infected or infested by the pest under natural conditions, 2) are frequently described as major, primary, or preferred hosts, and 3) have primary evidence for feeding and damage documented in the literature. Plants are highlighted in bold if they are commercially produced and the pest causes economically significant damage.

Table 1. Preferred hosts of *C. suppressalis*

Scientific Name	Common Name	Presence in the US	Type/Use	Reference
Oryza sativa	Rice	Yes	Cultivated	Chen et al., 2011
*Zizania latifolia**	Wild rice	No	Wild	Ishida et al., 2000

*It is unknown whether other *Zizania* spp. grown in the U.S. would be susceptible to this pest.

Although not preferred hosts, there are multiple reports of this pest on *Zea mays, Triticum aestivum, Saccharum officinarum, Beckmannia syzigachne*, and *Polypogon fugax* (Hou et al., 2010; Jiang et al., 2015). *Chilo suppressalis* uses these non-preferred hosts as overwintering sites (Hou et al., 2010).

Pest Importance

Chilo suppressalis is considered one of the most serious pests of rice in East Asia and a major constraint to rice production (Way et al., 1991). Annual losses ranging from 4 to 100% have been reported from different regions in Asia (Cheng et al., 2009; Cho et al., 2005; Jiang et al., 2003; Rahman et al., 2004).

In 2023, 2.8 million acres of rice were harvested in the United States, with a total value of $4.2 billion. Arkansas, California, Louisiana, Mississippi, Missouri and Texas are the major rice-producing states in the United States (USDA-NASS, 2024).

Chilo suppressalis is listed as a harmful organism in Brazil, Colombia, Ecuador, Honduras, Israel, Morocco, Mozambique, Oman, Peru, Qatar, Turkey, and the United Arab Emirates (USDA-PCIT, 2024). There may be trade implications with these countries if this pest becomes established in the continental United States.

Pathogens or Associated Organisms Vectored

This species is not known to be associated with pathogens or other organisms.

Known Distribution

Region/Continent	Country	Reference
Asia	Bangladesh	Catling et al., 1984; Rahman et al., 2004
	Cambodia	Long et al., 2018
	China	Chen et al., 2014; Gao et al., 2013
	India	Singh et al., 2014
	Indonesia	Hattori et al., 1986
	Iran	Ebert, 1973
	Japan	Kanno et al., 1985
	Laos	Dean, 1978
	Malaysia	Rothschild, 1971
	Pakistan	Afzal et al., 1977

Region/Continent	Country	Reference
Asia (cont.)	Philippines	Cohen et al., 2000
	South Korea	Catling et al., 1977
	Sri Lanka	Nimanthika et al., 2019
	Taiwan	Cheng et al., 2009
	Thailand	Wongsiri, 1974
	Vietnam	Ngoan, 1971
Europe	France	Galichet, 1979
	Hungary	Fazekas, 2019
	Portugal	Corley et al., 2018
	Russia	Poltavsky et al., 2015
	Spain	Alfaro et al., 2009
Oceania	Australia	Li, 1990

Chilo suppressalis has previously been previously reported in Papua New Guinea (Li, 1990), but we could not find any recent evidence of its presence there. Brunei, Burma, and Nepal are listed as distribution records for *C. suppressalis*; however, we could not locate direct evidence to support this.

<u>Status of infestation in the United States (July 2025)</u>

Chilo suppressalis was reported in Hawaii in in 1927, and may have hastened the decline of the rice industry in Hawaii (USDA, 1957). Yasumatsu et al. (1968) stated that the Asiatic rice borer became extinct in Hawaii sometime between 1939 and 1962, but it was identified on rice at Wailalua, Kauai in 1968. It is unknown whether the infestation resulted from progeny of borers from those discovered in 1929 or a new introduction (addendum to Yasumatsu et al., 1968). There have been no reports of this species in Hawaii since 1968 (Yasumatsu et al., 1968) and no hosts are commercially produced there (USDA-NASS, 2024).

Pathway

Larvae and pupae can spread into new areas within infested rice straw used as packaging material (Neupane, 1990; Yasumatsu et al., 1968). Because larvae and pupae develop within rice stems, and eggs are deposited in masses on leaves, they can also be spread into new areas through the movement of live plants. Larvae typically are present on a single plant for at least a week before dispersing to new plant at least 10 ft away (Cohen et al., 2000). Adults are short-lived and have less chance of surviving transport. Although natural dispersal is an unlikely pathway, adults flew as far as 0.5 miles in mark-release-recapture experiments (Hyun, 1972) and up to 7.5 miles in flight mill experiments (Kondo et al., 1993).

Effective April 18, 2018, the import of rice plants for planting, including seeds, from all countries into all ports in the United States is not authorized pending pest risk analysis (USDA ACIR, 2024).

Use the PPQ Commodity Import and Export manuals listed below to determine 1) if host plants or material are allowed to enter the United States from countries where the organism is present and 2) what phytosanitary measures (e.g., inspections, phytosanitary certificates, post entry quarantines, mandatory treatments) are in use. These manuals are updated regularly.

Agricultural Commodity Import Requirements(ACIR) manual: ACIR provides a single source to search for and retrieve entry requirements for imported commodities. https://acir.aphis.usda.gov/s/

Potential Distribution within the United States

Based on the known distribution of this pest and comparing those climates to plant hardiness zones (Takeuchi et al., 2018), *C. suppressalis* could establish in plant hardiness zones 4-14. In addition to surviving high temperatures in tropical regions, this pest was collected from different rice fields over the world (Russia and China) under PHZ 4-6. A likelihood of establishment map has been developed for *C. suppressalis*; based on this map, the majority of the continental United States, Hawaii, and Puerto Rico have suitable conditions for the establishment of this pest (SAFARIS, 2025).

Rice is commercially grown throughout the southern region of the United States, including Arkansas, California, Louisiana, Mississippi, Missouri, and Texas (USDA-NASS, 2024). All rice producing areas in the United States are at risk for the introduction and establishment of the pest due to climatic suitability.

Survey and Key Diagnostics

Approved Methods for Pest Surveillance*:

For the current approved methods and guidance for survey and identification, see Approved Methods for Pest Surveillance (AMPS) pest page on the CAPS Resource and Collaboration website, at https://approvedmethods.ceris.purdue.edu/.

References

Afzal, M., I. Ahmad, and M. A. M. Khan. 1977. Estimation of infestation due to paddy stem borers in Lower Sind. Chemosphere 9:545-550.

Alfaro, C., V. Navarro-Llopis, and J. Primo. 2009. Optimization of pheromone dispenser density for managing the rice striped stem borer, *Chilo suppressalis* (Walker), by mating disruption. Crop Protection 28(7):567-572.

Atapour, M., and S. Moharramipour. 2009. Changes of cold hardiness, supercooling capacity, and major cryoprotectants in overwintering larvae of *Chilo suppressalis* (Lepidoptera: Pyralidae). Environmental Entomology 38(1):260-265.

Bleszynski, S. (Bulletin). 1970. A revision of the world species of *Chilo* Zincken (Lepidoptera: Pyralidae). Bulletin of the British Museum of Natural History 25(4):99-196.

Caballero, P. 1985. Allelochemicals from soybean affecting *Pseudoplusia includens* (Walker) biology and pheromone from *Chilo plejadellus* Zinken mediating *C. plejadellus* sexual behavior (Looper), Louisiana State University and Agricultural & Mechanical College, Louisiana. 95 pp.

Capps, H. W. 1963. Description of a new species of *Chilo* (Crambidae). Journal of the Lepidopterists' Society 17(1):31-32.

Catling, H. D., Z. Islam, and R. Pattrasudhi. 1984. Seasonal occurrence of the yellow stem borer *Scirpophaga incertulas* (Walker) on deepwater rice in Bangladesh and Thailand. Agriculture, ecosystems & environment 12(1):47-71.

Catling, H. D., and S. C. Lee. 1977. Studies on economic damage of Korean rice pests. Korean Journal of Plant Protection 16(2):79-86.

Chen, M., A. Shelton, and G.-y. Ye. 2011. Insect-resistant genetically modified rice in China: from research to commercialization. Annual Review of Entomology 56:81-101.

Chen, R. Z., M. G. Klein, C. F. Sheng, Q. Y. Li, Y. Li, and L. B. Li. 2014. Mating disruption or mass trapping, compared with chemical insecticides, for suppression of *Chilo suppressalis* (Lepidoptera: Crambidae) in northeastern China. Journal of Economic Entomology 107(5):1828-1838.

Cheng, X., C. Chang, and S. M. Dai. 2009. Responses of striped stem borer, *Chilo suppressalis* (Lepidoptera: Pyralidae), from Taiwan to a range of insecticides. Pest Management Science 66:762-766.

Cho, J. R., J. S. Lee, J. J. Kim, M. Lee, H.-s. Kim, and K. S. Boo. 2005. Cold hardiness of diapausing rice stem borer, *Chilo suppressalis* Walker (Lepidoptera: Pyralidae). Journal of Asia-Pacific Entomology 8(2):161-166.

Cohen, M. B., A. M. Romena, and F. Gould. 2000. Dispersal by larvae of the stem borers *Scirpophaga incertulas* (Lepidoptera: Pyralidae) and *Chilo suppressalis* (Lepidoptera: Crambidae) in plots of transplanted rice. Environmental Entomology 29(5):958-971.

Corley, M. F. V., J. Rosete, A. R. Gonçalves, V. Mata, J. Nunes, and P. Pires. 2018. New and interesting Portuguese Lepidoptera records from 2016 (Insecta: Lepidoptera). SHILAP Revista de lepidopterología 46(181):33-56.

Dean, G. J. W. 1978. Insect pests of rice in Laos. International Journal of Pest Management 24(3):280-289.

Dinardo-Miranda, L. L., I. A. d. Anjos, V. P. d. Costa, and J. V. Fracasso. 2012. Resistance of sugarcane cultivars to *Diatraea saccharalis*. Pesquisa Agropecuária Brasileira 47(1):1-7.

Durden, L., J. A. Sanchez-Ruiz, D. G. Albanese, and J. M. Buchbinder. 2019. Assessing insect biodiversity and promoting sustainable practices toward pollinators on campus. Georgia Southern University, Statesboro, GA. 32 pp.

Ebert, G. 1973. The rice stem borer *Chilo suppressalis* Walker (Lep./Pyral.), a new pest for Iran. Entomologie et Phytopathologie Appliquees 35:1-25.

El-Sayed, A. M. 2024. The Pherobase: Database of Pheromones and Semiochemicals. Last accessed 11/05, https://www.pherobase.com/database/species/species-Chilo-suppressalis.php.

Fazekas, I. 2019. A *Stenomesius rufescens* (Retzius, 1783) a *Choreutis nemorana* (Hübner, 1799) parazitája Magyarországon (Hymenoptera, Lepidoptera) [*Stenomesius rufescens* (Retzius, 1783), a parasite of *Choreutis nemorana* (Hübner, 1799) in Hungary (Hymenoptera, Lepidoptera)]. Microlepidoptera 15:21-28.

Fogliata, S. V., A. Vera, G. Gastaminza, M. I. Cuenya, M. I. Zucchi, E. Willink, A. P. Castagnaro, and M. G. Murúa. 2016. Reproductive isolation between two populations of *Diatraea saccharalis* (F.) (Lepidoptera: Crambidae) from different host plant species and regions in Argentina. Bulletin of Entomological Research 106(5):591-597.

Galichet, P. F. 1979. Hibernation d'*Apanteles chilonis* [Hym.: Braconidae] sous le climat méditerranéen. Entomophaga 24(2):119-130.

Gao, C., R. Yao, Z. Zhang, M. Wu, S. Zhang, and J. Su. 2013. Susceptibility baseline and chlorantraniliprole resistance monitoring in *Chilo suppressalis* (Lepidoptera: Pyralidae). Journal of Economic Entomology 106(5):2190-2194.

Gavara, A., S. Vacas, J. Primo, and V. Navarro-Llopis. 2021. Mating disruption of striped rice stem borer: Importance of early deployment of dispensers and impact on airborne pheromone concentration. Rice Science 28(6):525-528.

Gilligan, T. M., and S. C. Passoa. 2014. Screening aid: Asiatic rice borer *Chilo suppressalis* (Walker). Identification Technology Program (ITP), USDA-APHIS-PPQ-S&T, Fort Collins, CO. 5 pp.

Hamm, J. C., J. K. Sidhu, M. J. Stout, N. A. Hummel, and T. E. Reagan. 2012. Oviposition behavior of *Diatraea saccharalis* (Lepidoptera: Crambidae) on different rice cultivars in Louisiana. Environmental Entomology 41(3):571-577.

Han, S. Y., C. S. Yoon, and H. J. Sun. 1982. A phenological simulation of the striped rice borer, *Chilo suppressalis* (Walker), life system. Korean Journal of Applied Entomology 21(4):200-206.

Harris, K. M. 1990. Bioecology of *Chilo* species. Insect Science and Its Application 11(4/5):467-477.

Hattori, I., and S. S. Siwi. 1986. Rice stemborers in Indonesia. Japan Agricultural Research Quarterly 20:25-30.

Heppner, J. B. 2007. Arthropods of Florida and neighboring land area: Lepidoptera of Florida. Florida Department of Agriculture & Consumer Services, Gainsville, Florida. 670 pp.

Hou, M., L. Hao, Y. Han, and X. Liao. 2010. Host status of wheat and corn for *Chilo suppressalis* (Lepidoptera: Crambidae). Environmental Entomology 39(6):1929-1935.

Hyun, J. S. 1972. Study on the flying dispersion and radiation of the rice stem borer, (*Chilo suppressalis* Walker). Part of a coordinated programme for rice insect control and eradication (IAEA-R-439-F). International Atomic Energy Agency, Seoul National University, Korea.

Ishida, S., H. Kikui, and K. Tsuchida. 2000. Seasonal prevalence of the rice stem borer moth, *Chilo suppressalis* (Lepidoptera: Pyralidae) feeding on water-oats (*Zizania* *latifolia*) and the influence of its two egg parasites. Research Bulletin of the Faculty of Agriculture, Gifu University 65:21-27.

Jiang, F., G. Chang, Z. Li, M. Abouzaid, X. Du, J. J. Hull, W. Ma, and Y. Lin. 2021. The HSP/co-chaperone network in environmental cold adaptation of *Chilo suppressalis*. International Journal of Biological Macromolecules 187(1):780-788.

Jiang, M. X., and J. A. Cheng. 2003. Interactions between the striped stem borer *Chilo suppressalis* (Walk.) (Lep., Pyralidae) larvae and rice plants in response to nitrogen fertilization. Anzeiger für Schädlingskunde [Journal of pest science] 76:124-128.

Jiang, W. H., H. D. Li, X. F. Cheng, J. R. Ye, Y. B. Feng, and Z. J. Han. 2015. Study on host plants for reproduction of *Chilo suppressalis*. Journal of Asia-Pacific Entomology 18:591-595.

Joyce, A. L., W. H. White, G. S. Nuessly, M. A. Solis, S. J. Scheffer, M. L. Lewis, and R. F. Medina. 2014. Geographic population structure of the sugarcane borer, *Diatraea saccharalis* (F.) (Lepidoptera: Crambidae), in the southern United States. PLoS One 9(10):e110036.

Kanno, H., N. Abe, M. Mizusawa, Y. Saeki, K. Koike, and S. Kobayashi. 1985. Comparison of the trap efficiency and of the fluctuation pattern of moth catches between the synthetic sex pheromone and the light-trap in the rice stem borer moth, *Chilo suppressalis* Walker (Lepidoptera: Pyralidae). Japanese Journal of Applied Entomology and Zoology 29(2):137-139.

Kiritani, K. 1990. Recent population trends of *Chilo suppressalis* in temperate and sub-tropical Asia. Insect Science and Its Application 11(4/5):555-562.

Kiritani, K., and S. Iwao. 1967. The biology and life cycle of *Chilo suppressalis* (Walker) and *Tryporyza (Schoenobius) insertulas (*Walker) in temperate-climate areas. Pages 45-101 *in* Symposium on the major insect pests of the rice plant, International Rice Research Institute. September 1964.

Kishino, K. 1974. Local differences of seasonal life cycle in rice stem borer, *Chilo Suppressalis* Walker. Japan Agricultural Research Quarterly 8(2):72-77.

Kondo, A., F. Tanaka, H. Sugie, and N. Hokyo. 1993. Analysis of some biological factors affecting differential pheromone trap efficiency between generations in the rice stem borer moth, *Chilo suppressalis* (Walker) (Lepidoptera: Pyralidae). Applied Entomology and Zoology 28(4):503-511.

Lee, H. S. 2014. Prediction of phenological changes of *Chilo suppressalis* (Walker) (Lepidoptera: Pyralidae) under global warming. Master's thesis, Seoul National University Graduate School, Seoul, Korea. 98 pp.

Li, C. S. 1990. Status and control of *Chilo* spp., their distribution, host range and economic importance in Oceania. Insect Science and Its Application 11(4/5):535-539.

Linscombe, S., and B. Leonards. 2010. Knowledge of Rice Growth Stages Important. Louisiana State University AgCenter and Louisiana State University College of Agriculture, Louisiana. Last accessed 11/11, https://www.lsuagcenter.com/portals/our_offices/research_stations/rice/features/publications/knowledge-of-rice-growth-stages-important.

Long, K. D., and Y. Try. 2018. A survey on parasitoids of rice pest insects in Sisophon, northwest Cambodia. Academia Journal of Biology 40(4):143-146.

Lu, M. X., S. S. Cao, Z. X. Liu, X. Wang, and Y. Z. Du. 2014. Heat tolerance of developmental and seasonal stages of C*hilo suppressalis*. Entomologia Experimentalis et Applicata 152(2):91-99.

Mulcahy, M. M., B. E. Wilson, and T. E. Reagan. 2022. Spatial distribution of lepidopteran stem borers in Louisiana rice fields. Environmental Entomology 51(2):405-412.

Neupane, F. P. 1990. Status and control of *Chilo* spp. on cereal crops in southern Asia. International Journal of Tropical Insect Science 11(4-5):501-534.

Ngoan, N. D. 1971. Recent progress in rice insect research in Vietnam. Pages 133-141 *in* International symposium on rice insects, Tokyo, Japan. July 19-24, 1971.

Nimanthika, W. J., K. S. I. Senevirathne, H. M. I. C. Ruwanthika, I. S. A. Koralage, and J. D. Rey. 2019. Bio-surveillance of economically important insect pests in a mixed-crop agriculture system: Insights from DNA barcodes. Philippine Journal of Crop Science 44(3):93-116.

Pathak, M. D., and Z. R. Khan. 1994. Stem borers. Pages 5-17 Insect pests of rice. International Rice Research Institute, Manila, Philippines.

Peterson, A. G., D. M. Noetzel, J. E. Sargent, P. E. Hanson, C. B. Johnson, and A. T. Soemawinata. 1981. Insects of wild rice in Minnesota (157). University of Minnesota, Agricultural Experiment Station, St. Paul, MN. 15 pp.

Poltavsky, A. N., and K. S. Artokhin. 2015. Invasions by *Chilo* Zincken, 1817 to the south of European Russia (Lepidoptera: Crambidae). SHILAP Revista de Lepidopterología 43(171):461-465.

Rahman, M. T., M. Khalequzzaman, and M. A. R. Khan. 2004. Assessment of infestation and yield loss by stem borers on variety of rice. Journal of Asia-Pacific Entomology 7(1):89-95.

Ramoneda, J., and J. Roig. 1993. Characteristics of the larval development of the rice stem borer, *Chilo suppressalis* Walker (Lepidoptera: Crambidae) in the Ebro Delta (Northeastern Spain). Applied Entomology and Zoology 28(3):267-273.

Reissig, W. H., E. A. Heinrichs, L. A. Litsinger, K. Moody, L. Fiedler, T. W. Mew, and A. T. Barrion. 1986. Illustrated guide to integrated pest management in rice in tropical Asia. International Rice Research Institute, Los Baños, Laguna, Philippines.

Roe, R. M. 1981. A bibliography of the sugarcane borer, *Diatraea saccharalis* (Fabricius), 1887-1980. Agricultural Research Service (Southern Region), United States Department of Agriculture, New Orleans. 101 pp.

Roldán, E. L., J. M. Beuzelin, M. T. VanWeelden, and R. H. Cherry. 2020. The sugarcane borer (Lepidoptera: Crambidae) infests rice at low population levels in Florida. Journal of Economic Entomology 113(1):538-542.

Rothschild, G. H. L. 1971. The biology and ecology of rice-stem borers in Sarawak (Malaysian Borneo). Journal of Applied Ecology 8(2):287-322.

Royals, H. R., T. M. Gilligan, and S. C. Passoa. 2017. Screening aid: Stem borers *Chilo* spp. Identification Technology Program (ITP), USDA-APHIS-PPQ-S&T, Fort Collins, CO. 5 pp.

SAFARIS. 2025. Climate Suitability Maps for Pest Surveillance. Spatial Analytic Framework for Advanced Risk Information Systems (SAFARIS), Raleigh, NC. https://safaris.cipm.info/safarispestmodel/StartupServlet?cindex. Last accessed

Singh, B. B., and R. Singh. 2014. Major rice insect pests in northeastern UP. International Journal of Life Sciences Biotechnology and Pharma Research 3(1):124-143.
Stiling, P. D., and D. R. Strong. 1983. Weak competition among *Spartina* stem borers, by means of murder. Ecology 64(4):770-778.
Takeuchi, Y., G. Fowler, and A. S. Joseph. 2018. SAFARIS: Global plant hardiness zone development. North Carolina State University, Center for Integrated Pest Management; United States Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine, Science and Technology, Plant Epidemiology and Risk Analysis Laboratory.
Tsumuki, H., T. Take, K. Kanehisa, T. Saito, and Y. I. Chu. 1994. Effect of temperature on the development and voltinism of the rice stem borer, *Chilo suppressalis* (Lepidoptera: Pyralidae) in Taiwan. European Journal of Entomology 91(4):477-479.
USDA-NASS. 2024. Census of Agriculture 2022. United States Department of Agriculture, National Agricultural Statistics Service. https://www.nass.usda.gov/
USDA-PCIT. 2024. Phytosanitary export database (PExD): Harmful organisms by country and commodity report format: *Chilo suppressalis*. United States Department of Agriculture. https://pcit.aphis.usda.gov/PExD/faces/ViewPExD.jsp
USDA. 1957. Insects not known to occur in the United States. Asiatic rice borer (*Chilo suppressalis* (Walker)). United States Department of Agriculture, Agricultural Research Service, Washington, DC. 67 pp.
USDA ACIR. 2024. Agricultural Commodity Import Requirements manual: Report for *Oryza sativa*. United Staes Department of Agriculture, Washington, D.C.
Way, M. O., and C. C. Bowling. 1991. Insect pests of rice. Pages 237-268 *in* B. S. Luh, (ed.). Rice: Volume I. Production/Volume II. Utilization. Springer US, Boston, MA.
Way, M. O., and J. Cockrell. 2007. 2007 Texas rice production guidelines. Texas Agricultural Experiment Station, Texas Cooperative Extension. 75 pp.
Wongsiri, T. 1974. Research on rice insects in Thailand. Pages 117-127 The sterile-insect technique and its field applications, Vienna, Austria.
Xiang, X., S. Liu, H. Li, A. Danso Ofori, X. Yi, and A. Zheng. 2023. Defense strategies of rice in response to the attack of the herbivorous insect, *Chilo suppressalis*. International Journal of Molecular Sciences 24(18):14361.
Yasumatsu, K., T. Nishida, and H. A. Bess. 1968. On the extinction of the Asiatic rice borer *Chilo suppressalis* in Hawaii. Proceedings of the Hawaiian Entomological Society 20(1):239-245.

USDA-APHIS-PPQ-ST staff developed this datasheet. Cite this document as:

PPQ. 2025. Cooperative Agricultural Pest Survey (CAPS) Pest Datasheet for *Chilo suppressalis* (Crambidae): Asiatic rice borer. United States Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine (PPQ), Raleigh, NC.

Versions

August 2010: Datasheet completed (Version 1)
July 2025: Datasheet revised (Version 2)

- Added **Pest Recognition** section
- Added **Easily Mistaken Species** section
- Added **Commonly Encountered Non-targets** section
- Updated **Biology & Ecology** section
- Updated **Known hosts** section
- Updated **Pest Importance** section
- Updated **Pathogens or Associated Organisms Vectored** section
- Updated **Known Distribution** section
- Updated **Pathway** section
- Updated **Potential Distribution within the United States** section
- Updated guidance for **Approved Methods** section

Reviewer(s)

Sandra Vacas, Ph.D., Instituto Agroforestal del Mediterráneo (IAM) - Universitat Politècnica de València (UPV)