A Sex Attractant for Trapping Crambus cypridalis (Lepidoptera: Crambidae)

Authors: Peter J. Landolt, and Diana Roberts
Source: Florida Entomologist, 95(1): 194-195
Published By: Florida Entomological Society
URL: https://doi.org/10.1653/024.095.0130
A SEX ATTRACTANT FOR TRAPPING CRAMBUS CYPRIDALIS (LEPIDOPTERA: CRAMBIIDAE)

PETER J. LANDOLT1 AND DIANA ROBERTS2

1USDA, ARS, Yakima Agricultural Research Laboratory, 5230 Konnowac Pass Road, Wapato, WA 98951, USA
2Washington State University Extension Service, 222 N. Havana Street, Spokane, WA 99202, USA

Corresponding author, E-mail: peter.landolt@ars.usda.gov

_Crambus cypridalis_ (Hulst) (Lepidoptera: Crambidae) is widely distributed throughout the western United States (Crawford & Harwood 1964; Powell & Opler 2010). The larvae probably feed on grasses, as do congenic species (Robinson et al. 2002), but it is not reported as a crop pest. Monitoring of wheat head armyworm moth _Dargida_ (= _Faronta_) _diffusa_ (Walker) and the sibling species _Dargida_ (= _Faronta_) _terrapictalis_ (Buckett) in eastern Washington resulted in serendipitous captures of male _C. cypridalis_ in sex attractant-baited traps (Landolt et al. in press). This result led us to test the hypothesis that _C. cypridalis_ males are attracted to the combination of (Z)-11-hexadecenyl acetate (Z11-16Ac) and (Z)-11-hexadecenal (Z11-16Ald). We also report new information on the seasonal timing of captures of _C. cypridalis_ in sex-attractant traps, which was not included by Landolt et al. (2011).

Chemicals were dispensed from red rubber septa (West Co., Lionville, Pennsylvania) and tested in UniTraps (Agrisense Inc., Pontypridd, United Kingdom) with a 6 cm2 piece of Vaportape® (Hercon Environmental, Emigsville, Pennsylvania) placed within each trap bucket. Traps were attached to stakes at the edges of wheat fields.

In 2009 and in 2010, 31 and 13 traps, respectively, were baited with septa loaded with 1 mg Z11-16Ac plus 100 μg Z11-16Ald for trapping the wheat head armyworm moth (Landolt et al. in press). Of those traps, 16 in 2009 and 13 in 2010 were maintained long enough through the season to capture _C. cypridalis_. Other traps in that study were withdrawn earlier in Sep in response to the end of captures of _Dargida_ sp. Each trap was placed in a different wheat field in Grant and Lincoln Counties, Washington. We report on captures of _C. cypridalis_ in the 16 traps in 2009 that were maintained from late May through Sep, and on the 13 traps in 2010 that were maintained from the first week of May through Sep. Traps were checked weekly, and lures and Vaportape® were replaced monthly. None of these traps were accompanied by control traps because the objective of the study was to determine the presence of _Dargida_ sp moths, not to test the hypothesis of sex attraction.

A subsequent experiment then tested the hypothesis that _C. cypridalis_ is attracted to the wheat head armyworm sex attractant, and determined if both chemicals are necessary for attraction. Four trap treatments were used: 1) a control with no lure, 2) a septum with 1 mg of Z11-16Ac, 3) a septum with 100 μg of Z11-16Ald, and 4) a septum with the combination of 1 mg Z11-16Ac and 100 μg Z11-16Ald. A randomized complete block experimental design was used with 6 replicate blocks. Each block of traps was placed at a separate wheat field in Grant and Lincoln Counties, Washington. Traps were maintained and checked each week from 7 Sep to 5 Oct 2010.

Voucher specimens of _C. cypridalis_ were deposited in the M. T. James Entomological Collection of Washington State University, Pullman, Washington.

In 2009, male _C. cypridalis_ were captured in 14 of the 16 traps that were baited with Z11-16Ac plus Z11-16Ald, and that were maintained through Sep (14.2 ± 3.7 males per trap). In 2010 male _C. cypridalis_ were captured in all 13 of the same sex attractant traps (4.8 ± 1.3 males per trap). In both years, all _C. cypridalis_ moths were captured during the last 2 wk of Sep. We do not know when the moth flight ended because these traps were not maintained long enough into Oct.

In experiment 2, most male _C. cypridalis_ were captured in traps baited with Z11-16Ac plus Z11-16Ald (Table 1). None were trapped with Z11-16Ac alone, and only 3 moths were trapped with Z11-16Ald alone. These moths were captured from 14 Sep until 5 Oct, when traps were taken down.

_Males of the glassy cutworm moth, Apamea devastator_ (Brace), are also attracted to _Z11-16Ac_ plus _Z11-16Ald_ (Steck et al. 1977; Underhill et al. 1977; Landolt et al. 2011). The glassy cutworm co-occurs in eastern Washington wheat fields with _D. diffusa_, _D. terrapictalis_ and _C. cypridalis_. All are attracted to this same combination of chemicals, raising the question of how they might avoid inter-specific sexual
interactions. There is a seasonal separation in their flight patterns, which should provide some reproductive isolation among them, with the 2 Dargida species flying in late spring (May/ Jun) (Landolt et al. 2011), the glassy cutworm flying in summer (July/Aug), and C. cypridalis flying in early autumn (Sep/Oct). There may be additional chemicals present in the female sex pheromones of these moths that contribute to reproductive isolation. Steck et al. (1977) indicated a role of (Z)-7-dodecenyl acetate in sex attraction of C. devastator, as well as Z11-16Ac and Z11-16Ald. There are no reports however of characterization of pheromones produced or emitted by females of any of these 4 moth species.

The late season capture of male C. cypridalis in sex attractant traps in 2009 and 2010 is not consistent with other reports of the seasonality of occurrence of the adult. Powell & Opler (2010) indicate that this moth flies in mid summer; and Crawford & Harwood (1964) reported the flight of the same species in late summer. Perhaps the moth flight period varies with latitude and altitude, or there might be unresolved taxonomic issues with this species.

**SUMMARY**

Males of C. cypridalis were consistently captured in traps baited with Z11-16Ac plus Z11-16Ald. The consistent presence of C. cypridalis in eastern Washington wheat fields suggests the possibility that it infests wheat, but additional study is needed to determine its host plant(s), abundance, and any pest significance in this habitat. These moths were trapped in late Sep and early Oct, which differs from prior reports of activity. This report provides a new sex attractant for potential use in monitoring this species, as well as new information on its seasonality and geographic distribution.

**ACKNOWLEDGMENTS**

Attractant lures were made by Daryl Green and Bonnie Oehler, and traps were maintained and checked by Robin Garcia. This project was supported in part by funding from the Washington Wheat Commission provided to Washington State University. The identity of C. cypridalis was confirmed by Dr. Alma Solis, Systematic Entomology Laboratory, ARS, USDA, Beltsville, Maryland and U.S. National Museum, Washington, DC. USDA is an equal opportunity provider and employer.

**REFERENCES CITED**

Booij, C. J., and Voerman, S. 1984. (Z)-11-Hexadecenyl compounds as attractants for male microlepidoptera of the subfamilies Argyresthiinae, Glyphipteryginae, and Crambinae. Entomol. Exp. Appl. 36: 47-53.

Crawford, C. S., and Harwood, R. F. 1964. Bionomics and control of insects affecting Washington grass seed fields. Wash. State Univ. Agric. Exp. Stat. Tech. Bull. 44: 25 pp.

Landolt, P. J., Roberts, D., Corp, M., and Rondon, S. I. 2011. Trap response of Dargida terrapictalis (Buckett) (Lepidoptera: Noctidae) to a sex attractant in wheat growing areas of eastern Washington and neighboring Oregon. J. Kansas Entomol. Soc. 84: 139-147.

Powell, J. A., and Opler, P. A. 2010. Moths of Western North America. Univ. California Press, Berkeley, 369 pp.

Robinson, G. S., Ackery, P. R., Kitching, I. J., Beccaloni, G. W., and Hernandez, L. M. 2002. Host plants of the moth and butterfly caterpillars of America north of Mexico. Mem. Am. Entomol. Inst., Gainesville, Florida.

Steck, W., Underhill, E. W., Bailey, B. K., and Chisholm, M. D. 1977. A sex attractant for male moths of the glassy cutworm, Crymodes devastator (Brace): a mixture of Z-11-hexadecen-1-yl acetate, Z-11-hexadecenal, and Z-7-dodecen-1-yl acetate. Environ. Entomol. 6: 270-271.

Underhill, E. W., Chisholm, M. D., and Steck, W. 1977. Olefinic aldehydes as constituents of sex attractants for noctuid moths. Environ. Entomol. 6: 333-337.