

# First Record of *Uroleucon pseudoambrosiae* (Olive) and *Hyperomyzus pallidus* Hille Ris Lambers (Hemiptera: Aphididae) from India with a Key to the Aphids Infesting *Sonchus arvensis* Linnaeus

Rohini B Shashidharachar<sup>1\*</sup>, Sunil Joshi<sup>2</sup>, Suchithra Kumari MH<sup>3</sup>

<sup>1</sup>Department of Entomology, College of Horticulture, University of Agricultural and Horticultural Sciences, Mudigere, Karnataka, India

<sup>2</sup>Indian Council of Agricultural Research-National Bureau of Agricultural Insect Resources (ICAR-NBAIR), Bengaluru, Karnataka, India

<sup>3</sup>Department of Entomology, ICAR-KVK, University of Agricultural and Horticultural Sciences, Shivamogga, Karnataka, India

## Research Article

**Received:** 12-Nov-2024,  
Manuscript No. JZS-24-152145;  
**Editor assigned:** 15-Nov-2024,  
PreQC No. JZS-24-152145 (PQ);  
**Reviewed:** 29-Nov-2024, QC No.  
JZS-24-152145; **Revised:** 06-Dec-  
2024, Manuscript No. JZS-24-  
152145 (R); **Published:** 12-Dec-  
2024, DOI: 10.4172/2321-  
6190.12.4.001

**\*For Correspondence:**

Rohini B Shashidharachar,  
Department of Entomology,  
College of Horticulture, University  
of Agricultural and Horticultural  
Sciences, Mudigere, Karnataka,  
India.

**E-mail:**

rohinistar1192@gmail.com

**Citation:** Shashidharachar RB.

## ABSTRACT

*Uroleucon pseudoambrosiae* (Olive) and *Hyperomyzus pallidus* Hille Ris Lambers (Hemiptera: Aphididae) are recorded for the first time from India on *Sonchus arvensis* (L.). Apterous of both these aphids were found congregating and sucking the sap from the sow thistle stem and both the surfaces of leaves. A key to identify the aphid species infesting *S. arvensis* and photographic illustrations of live and mounted apterous viviparous females, of all nine species of aphids infesting sow thistle in India, are provided.

**Keywords:** Aphid; Asteraceae; Sow thistle; Olive; *Uroleucon*; species

## INTRODUCTION

*Uroleucon* Mordvilko is one of the largest genera of aphids in the world with around 190 species with majority of the species living on the stems and leaves of Asteraceae [1]. Of the 27 species of *Uroleucon*, so far recorded from Indian subregion, 20 are found in Northwest Himalaya, 14 are known from Eastern Himalaya and only 5 have so far been recorded from Peninsular India, which happened to be the study area of the present investigation [2]. Out of the five species of *Uroleucon* recorded in Peninsular India, *U. compositae* (Theobald), is of economic importance and is of regular occurrence on *Carthamus tinctorius* L.,

First Record of *Uroleucon pseudoambrosiae* (Olive) and *Hyperomyzus pallidus* Hille Ris Lambers (*Hemiptera: Aphididae*) from India with a Key to the Aphids Infesting *Sonchus arvensis* Linnaeus. Res Rev J Zool Sci. 2024;12:001

Copyright: © 2024

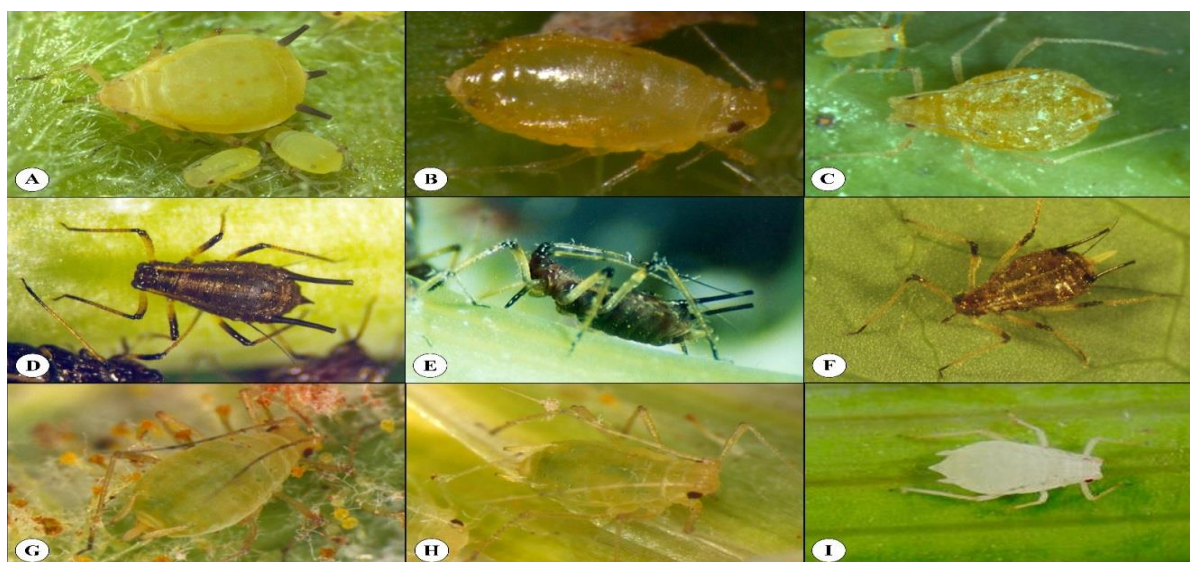
Shashidharachar RB. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

particularly in Maharashtra. About 20 species of *Hyperomyzus* Börner are known throughout the world and only two species are known from India [3].

*Sonchus arvensis* L. commonly known as perennial sow thistle, is a species of flowering plant in the family Asteraceae. It often occurs in annual crops in the northern parts of Europe and may cause substantial yield losses. It is native to Europe, where it is widespread across most of the continent but now it has also become naturalized in many other regions, including India [4,5]. It has been cultivated in China and New Zealand for its edible and medicinal usage. Since ancient times, *Sonchus* species has been treated as only a noxious weed of vegetable crops and others. But scientists and nutritionists worldwide have proved through their research findings that, although it is widely considered to be a weed, the potential nutritional and medicinal quality of *Sonchus* species is much more than any other leafy vegetables. In China, “Shen Nong’s Herbal Classic” recorded the use of *S. oleraceus* and *S. arvensis* in traditional Chinese medicine more than 1800 years ago. Recent research has reported that *Sonchus* species possess powerful pharmaceutical properties (e.g. hepatoprotective, anticancer, antioxidant, anti-inflammatory and antimicrobial) and helps to prevent cardiac dysfunction [6].

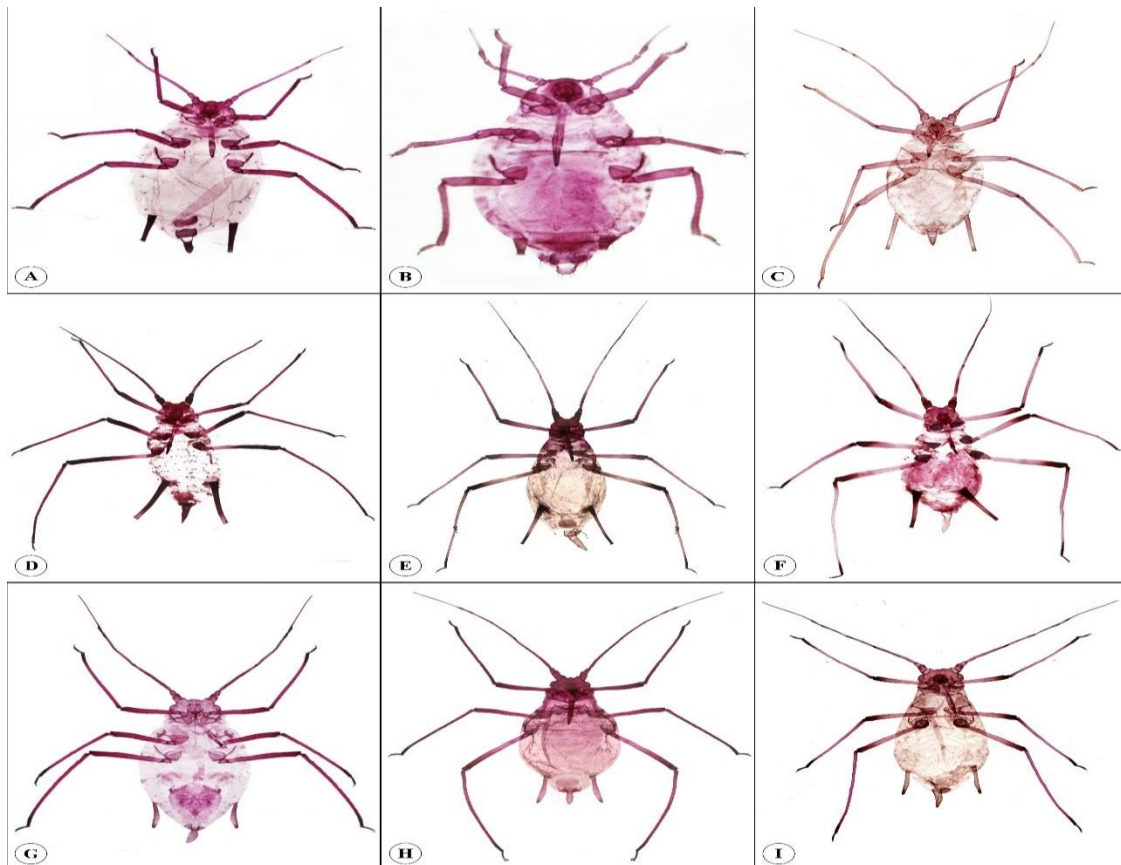
In India, prior to this study, seven species of aphids viz., *Aphis spiraecola* patch, were recorded infesting *S. arvensis* [7]. We report first occurrence of *Uroleucon (Uroleucon) pseudoambrosiae* (Olive) and *Hyperomyzus pallidus* Hille Ris Lambers from India as shown in Figure 1.

**Figure 1.** Live apterous viviparous females of aphids infesting *Sonchus arvensis* Linnaeus in India. **Note:** (A) *Aphis spiraecola* patch; (B) *Brachycaudus helichrysi* (Kaltenbach); (C) *Myzus persicae* (Sulzer); (D) *Uroleucon compositae* (Theobald); (E) *Uroleucon pseudoambrosiae* (Olive); (F) *Uroleucon sonchi* (Linnaeus); (G) *Hyperomyzus carduellinus* (Theobald); (H) *Hyperomyzus lactucae* (Linnaeus); (I) *Hyperomyzus pallidus* Hille Ris Lambers.



We also provide key to the aphid species infesting *S. arvensis* from India as many of these species resemble each other and are difficult to separate visually. We also provide live and mounted apterous viviparous female photographs of all nine species of aphids to aid in description and identification (Figure 2).

**Figure 2.** Mounted apterous viviparous females of aphids infesting *Sonchus arvensis* Linnaeus in India. **Note:** (A) *Aphis spiraecola* patch; (B) *Brachycaudus helichrysi* (Kaltenbach); (C) *Myzus persicae* (Sulzer); (D) *Uroleucon compositae* (Theobald); (E) *Uroleucon pseudoambrosiae* (Olive); (F) *Uroleucon sonchi* (Linnaeus); (G) *Hyperomyzus carduellinus* (Theobald); (H) *Hyperomyzus lactucae* (Linnaeus); (I) *Hyperomyzus pallidus* Hille Ris Lambers.



## MATERIALS AND METHODS

The aphid samples for this study were collected from different regions viz., Chikamagaluru and urban Bengaluru districts of Karnataka. The aphid samples were preserved in 70% ethanol and specimens were mounted in Canada balsam following the methods described by Blackman et al. Illustrations of slide-mounted specimens were taken by digital camera (Nikon Digital Sight DSVI -1) attached to a Nikon Eclipse 80 I microscope. Measurements for each specimen were taken from the digital image using the M205 A Leica application suite. The aphids were identified by using key to the aphids infesting herbaceous plants and shrubs devised by Blackman et al. and description of species of *Uroleucon* Mordvilko by Olive [8,9].

## RESULTS AND DISCUSSION

Following is information on nature of damage, morphological characters, morphometrics, distribution and biology of two newly discovered aphid species from India.

### *Uroleucon pseudoambrosiae* (Olive)

**Damage and incidence of aphid:** The aphid was recorded for the first time from Kadur (13.55°N 76.01°E; 763 MSL) of Chikkamagaluru district (Karnataka state) in the winter months of 2016 and further recorded from Vittal (12.76°N; and 75.03°E; 896 MSL) of Dakshin Kannada district (Karnataka state) in the month of April, 2018. Apteræ were found congregating and sucking the sap from the sow thistle stem portion and less aphids were found on both side of the leaves.

### Morphological description

**Live specimen:** Body large spindle shaped. Apteræ dark brown to reddish brown in colour. Legs pale yellowish and darker towards apex. Siphunculi dark and cauda pale. Antennae six segmented (Figure 1E).

**Cleared specimen:** Head and thorax dusky with pale abdomen. Antennal I, II and III segment dusky and remaining segments dark. Protuberant secondary rhinaria present on antennal segment III. Rostral segments III and IV+V dark. Legs pale and darker towards apices. Tarsi is slightly paler than apical tibia. Siphunculi is darker with slightly paler middle portion and with a zone polygonal reticulation occupying the subapical portion. Cauda, genital and anal plates are pale to dusky (Figure 1E).

**Measurements in mm:** Length of the body 3.77, width 1.60; antennae III: IV: V: 0.91: 0.61: 0.57: (0.17+0.83); URS 0.18; HT 0.23; SIPH 5.6; Cauda 2.2.

**Distribution:** The species has been reported from USA, Florida, Mexico, Canada (Manitoba, British Columbia) and has been introduced to Poland (Europe) <sup>[10]</sup>.

**Biology:** This species is known to infest 25 plant species belonging to 14 genera of family Asteraceae viz., *Antennaria plantaginifolia* (L.) Hook., *Aster* sp., *A. dumosus* L., *A. prenanthoides* Muhl., *A. undulatus* L., *Cichorium intybus* L., *Erigeron* sp., *Erigeron canadensis* L., *Eupatorium* sp., *E. hyssopifolium* L., *Gnaphalium obtusifolium* L., *Helianthus microcephalus* T. and G., *Hieracium gronovii* L., *H. scabrum* Michx., *Lactuca* sp., *L. canadensis* L., *L. hirsuta* Muhl., *L. scariola* L., *Prenanthes alba* L., *P. autumnalis* Walt., *Pyrrhopappus carolinianus* (Walt.) DC., *Senecio smallii* Britt., *Solidago* spp., *S. uliginosa* Nutt., and *Taraxacum officinale* Weber. Its common hosts are species of *Lactuca* (Olive, 1963). The species has been recorded elsewhere on *Sonchus oleraceus* L., however in present study we collected it from *S. arvensis* which is new host record for this species.

**Material examined:** INDIA: Karnataka, Chikkamagaluru, Kadur (13.55°N 76.01°E; 763 MSL) on *Sonchus arvensis* (L.) (Asteraceae), 24<sup>th</sup> January, 2017, Rohini; INDIA: Karnataka, Dakshin Kannada, Vittal (12.76°N; and 75.03°E; 896 MSL) on *Sonchus arvensis* (L.) (Asteraceae), 13<sup>th</sup> April, 2018, Sunil Joshi.



***Hyperomyzus pallidus* Hille Ris Lambers**

**Damage and incidence of aphid:** The aphid was recorded for the first time from Hebbal (13° 02' 28.80" N; 77° 35' 7.19" E) of Bengaluru Urban district (Karnataka state) in the month of February, 2015 and further recorded from Bhuvaneshwari Nagar (13° 4' 26.8592" N; 77° 30' 23.3851" E) of Bengaluru Urban district (Karnataka state) in the month of April, 2019. Apteræ and alates were found infesting and sucking the sap from the stem, flower bud and lower surface of leaves.

**Morphological description**

**Live specimen:** Medium sized, spindle shaped aphids. Apteræ are opaque, yellowish white in colour. Legs, antenna and siphunculi transparent. Terminal portion of all antennal segments dark. Eyes bright red. Alates with dark dorsomedial irregular brown patch and abdominal segments with smaller irregular brown pleural patches. Seen mainly on the stem and lower surfaces of the leaves (Figure 1I).

**Cleared specimen:** Head, legs, antenna dark, siphunculi and cauda dusky with pale abdomen. Antennal I, II and III segments dusky and remaining segments dark. Rostral segments III and IV+V dark. Legs dusky but darker towards apices. Cauda, genital and anal plates dusky (Figure 1I).

**Measurement in mm:** Length of the body 2.25, width 1.07; antennae III: IV: V: 0.52: 0.37: 0.89: (0.52+0.37): URS 0.13; HT 0.09; SIPH 0.42; Cauda 0.35.

**Distribution:** In Europe, Iran, Central Asia, east and west Siberia, North America and South America <sup>[11]</sup>.

**Biology:** The species is known to infest underside of the leaves and tips of the shoots of *Ribes uva-crispa* L. and *R. alpinium* L. in spring months and cause leaf curl. The species has heteroecious holocyclic life cycle and it reduces from *Ribes* spp. to *Sonchus* spp. in summer <sup>[12]</sup>.

**Material examined:** INDIA: Karnataka, Hebbal, Bangalore Urban, on *S. arvensis* (L.) (Asteraceae), 02<sup>nd</sup> February, 2015, Sunil Joshi; INDIA: Karnataka, Bhuvaneshwari nagar, Bangalore Urban, on *S. arvensis* (L.) (Asteraceae), 15<sup>th</sup> April, 2019, Sunil Joshi.

**Identification key for Aphid species infesting *Sonchus arvensis* in India**

Key to the species of *Uroleucon* Mordvilko occurring in India has been given by Ghosh. In addition to polyphagous aphid species viz., *Aphis spiraeicola* Patch and *Myzus persicae* (Sulzer), three species of *Uroleucon* and three species of *Hyperomyzus* Richards are known to infest *Sonchus arvensis* in India. Following is the key to separate aphid species infesting *S. arvensis* in India.

1. Head without or poorly developed frontal tubercles.  
Head with moderately or well-developed frontal tubercles.
2. Siphunculi cylindrical, cauda tongue shaped *Aphis spiraeicola* patch.  
Siphunculi subcylindrical, cauda helmet shaped *Brachycadus helichrysi* (Kaltenbach).
3. Head with tubercles having converging inner faces, siphunculi cylindrical without polygonal reticulation *Myzus persicae*.  
Head with tubercles having diverging inner faces.

4. Siphunculi cylindrical with polygonal reticulation.  
Siphunculi clavate, not reticulated but sometimes a few interconnecting striae present near the apical flange.
5. Cauda is almost as dark as SIPH, ANT III with 48-86 rhinaria *U. compositae*.  
Cauda is much paler than SIPH, ANT III with less than 18-40 rhinaria.
6. Coxa is dark, R IV+V 0.73-0.88 × HT II, Dorsal hairs on ABD TERG 1-5 usually not on dark scleroites, or on very small scleroites *U. sonchi*.  
Coxa is pale, R IV+V 0.9-1.84 × HT II, Dorsal hairs on ABD TERG 1-5 all or mostly placed on dark *U. pseudoambrosiae*.
7. Secondary rhinaria distributed ANT III 11-29, IV (0)-1-16, V 0 (-9), ANT PT/BASE 4.3-5.6, ANT PT 1.6-2.3 × cauda *H. carduellinus*.  
Secondary rhinaria distributed ANT III 4-40, IV 0-2, V 0, ANT PT/BASE 4.8-7.9, ANT PT 2.0-3.0 × cauda.
8. SIPH 3-5 × longer than maximum width of swollen part, which is 1.6-2.4 × minimum width on basal part. R IV+V 0.9-1.12 × HT II (mostly 0.95-1.1 ×) *H. pallidus*.  
SIPH 4-7 × longer than maximum width of swollen part, which is 1.3-2.0 × minimum width on basal part. R IV+V 0.8-1.07 × HT II (mostly 0.9-1.0 ×) *H. lactucae*.

## Remarks

*Uroleucon pseudoambrosiae* closely resemble *U. ambrosiae* and *U. sonchi* and they also share similar host plants. Hind tarsi of *U. ambrosiae* is stout and it is much shorter than antennal segment I, whereas in *U. pseudoambrosiae* it is slender, equal to or longer than antennal segment I [9]. Coxa of *U. sonchi* is as dark as siphunculi but it is paler than siphunculi in case of *U. pseudoambrosiae*. *Hyperomyzus pallidus* can be easily separated from *H. lactucae* and *H. carduellinus* because of its pale whitish yellow colour, however sometimes it can be concolorous with later two species. *Hyperomyzus carduellinus* possesses fewer secondary rhinaria as compared to *H. pallidus* and *H. lactucae*. *Hyperomyzus pallidus* has shorter and wider siphunculi as compared to siphunculi of *H. lactucae*, which are longer and slender.

## Biosecurity and management

Both the newly recorded species infest *S. arvensis* which belongs to family Asteraceae. There are several economically important ornamental plants and vegetables under this family. In future, these species may emerge as an economically important pests and expand their geographical ranges. More surveys need to be conducted for recording host plants, natural enemies and expansion of geographical ranges to understand biology and ecology of these newly arrived pests.

## CONCLUSION

This study provides the first recorded occurrence of *Uroleucon pseudoambrosiae* (Olive) and *Hyperomyzus pallidus* Hille Ris Lambers infesting *Sonchus arvensis* (L.). The findings expand the known aphid fauna associated with this weed species in India. A comprehensive key for identifying the aphid species that infest *S. arvensis*, along with photographic illustrations of apterous viviparous females, has been provided to aid in the accurate identification of these species. The discovery of these aphid species adds to the growing understanding of the diversity and ecological role of aphids in agricultural and natural ecosystems in India. Further studies are warranted to explore the potential economic and ecological impact of these aphid species on *S. arvensis* and other host plants in the region.

## ACKNOWLEDGMENTS

This feat was possible because of the unconditional support, guidance and laboratory facilities provided by ICAR-National Bureau of Agricultural Insect Resources, Bengaluru. The first author would like to express deep sense of gratitude and indebtedness to Mr. K. Harish, Lab Assistant, ICAR-NBAIR.

## REFERENCES

1. Blackman RL, et al. Aphids on the world's crops: An identification and information guide. 2000;466.
2. Blackman RL, et al. Aphids on the World's Herbaceous Plants and Shrubs. John Wiley & Sons. 2008.
3. Chakrabarti S. Diversity, distribution and endemism of aphids (*Hemiptera*) in Indian Subregion of oriental realm. 2009;79-85.
4. EPP0. Annual Report and Council Recommendations. EPP0 Bulletin. 2019;45:479-492.
5. Ghosh AK, et al. The Fauna of India and the adjacent countries (Homoptera: *Aphidoidea*) Zool Surv India Calcutta. 2017;1-823.
6. Hille Ris Lambers D. Contributions to a monograph of the *Aphididae* of Europe. V. 1953;9:1-176.
7. Holm LG. World Weeds: Natural Histories and Distribution. John Wiley & Sons. 1997.
8. Li XM, et al. Research progress of *Sonchus* species. Int J Food Prop. 2018;21:147-157.
9. Nafra JM, et al. The genus *Aphis* (*Hemiptera*, *Aphididae*) living on *Asteraceae* species in Southern South America: Argentina and Chile, with five new species. Zootaxa. 2022;5183:439-463.
10. Olive AT. The genus *Dactynotus* *rafinesque* in North Carolina (Homoptera: *Aphidae*). Misc Publ Entomol Soc America. 1963;4:48-52.
11. Osiadacz B, et al. The aphids (*Hemiptera*: *Aphididae*) on *Campanulaceae* in Poland. J Entomol. 2010;80:191-202.
12. Raychaudhuri DN. Food-plant catalogue of Indian *Aphididae* (Homoptera: *Aphididae*). 1983.