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## Checklist of aphidophagous spiders (Arachnida: Araneae) in India

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### Abstract

Checklist of biodiversity of the aphidophagous spiders (Arachnida: Araneae) that play a vital role in natural control of insect population in all terrestrial ecosystems, in different states and the union territories of India is presented herewith along with their prey (aphid) species (Hemiptera: Aphididae) infesting different food plants. A total of 79 species of spiders were recorded as aphidophagous in 20 states/union territories of India belonging to 16 families, Araneidae being the largest one comprising 18 species under 9 genera followed by Thomisidae (12 species in 9 genera) and Salticidae (11 species in 10 genera). All these spiders prey on 53 species of aphids infesting 59 species of plants. Maximum 32 species of spiders accept *Aphis* (*Aphis*) *gossypii* Glover, 1877 as prey followed by *Aphis* (*Aphis*) *craccivora* Koch, 1854 (23 spider species of spiders) and *Lipaphis* (*Lipaphis*) *erysimi* (Kaltenbach, 1843) (12 spider species).

**Keywords:** Aphidophagous spiders, Araneae, aphids, checklist, India.

### Introduction

The spiders (Araneae: Arachnida: Chelicerata: Arthropoda) are an exceedingly precious component of the earth's ecosystem being predatory consuming mostly insects keeping their population under check and hardly pose any danger to humans (Nyffeler & Birkhofer, 2017). They also serve as ecological indicators owing to their extreme sensitivity against their habitat disturbances (Stojanowska *et al.*, 2020). The order

Araneae ranks sixth, with 52,347 species in 4,396 genera belonging to 134 families (World Spider Catalog, 2024), after the five largest insect orders (Coleoptera, Lepidoptera, Hymenoptera, Diptera, Hemiptera) in terms of species diversity. Despite having very rich biodiversity and a tropical climate with biodiversity hotspots, only 2,245 species described under 563 genera comprising 65 families are recorded in India (Singh *et al.*, 2023a). As a major generalist predator group, spiders which feed on terrestrial arthropod communities, are one of the most abundant, diversified and omnipresent populations in both natural and agricultural habitats (Wise, 1993), though their potential as biocontrol agents is less exploited to its fullest, similar to ladybird beetles (Riechert & Lockley, 1984). The spider community comprise several different ecological guilds (a group of species utilising the same resource in similar ways) such as they are either of orb web weavers (trap the prey in silken circular or hexagonal web), stalkers or jumping spiders (active hunters), ground runners (chase the prey on the ground), foliage runners (on the foliage of the crops), space builders (irregular web to trap preys), ambushers (grasp unsuspecting insects that come within contact), etc. (Cardoso *et al.*, 2011). Thus, the spider community has several tactics to capture prey depending upon the species, habitats and kind of food. It implies that by having several different guilds, they are generally more likely to suppress insect pests than more homogenous communities like insect predators and parasitoids (Uetz, 1992). Also, they are relatively resistant to starvation, pesticides and desiccation in agricultural ecosystems and the risks associated with using them to control pests are minimal (Riechert & Lockley, 1984). However, the significance of the spiders in natural control agents in agroecosystems, forest ecosystems, and other terrestrial ecosystems is largely unknown (Nyffeler & Benz, 1987).

Spiders are common generalist predators in agroecosystems and have been suggested to lower herbivore abundance in crops. However, it is not clear, if spiders can effectively suppress pest populations (Gavish-Regev *et al.*, 2009). Generalist predators usually live longer than their prey and prey on many types of prey. Because of this lack of specificity, generalist predators do not usually exhibit a density-dependent response to their prey and according to Hassell (1978) the generalist predators do not efficiently control populations of their prey. Moreover, as natural bioagents, the role of spiders in rice fields (Barrion & Litsinger, 1995; Singh & Singh, 2014; Joshi & Venkateshwarlu, 2016), cotton fields (Jeyaparvathi *et al.*, 2013; Nagrare *et al.*, 2015; Deshmukh, 2017), wheat fields (Birkhofer *et al.*, 2008; Sherawat & Butt, 2014) and apple orchards (Wyss *et al.*, 1995; Khan, 2016) had already been acknowledged.

The aphids (Hemiptera: Aphididae) are soft-bodied plant sap-sucking insects infesting almost all parts of several species of plants. Globally, more than 250 species of aphids are notorious pests of both agricultural and horticultural crops (Singh & Singh, 2016). Sometimes, the damage in some crops is to the extent that nothing remains to harvest, particularly in the case of some cereals, potatoes and mustard (Singh & Singh, 2021a). There is a number of unique features that contribute to their success such as polyphagy, peculiar mode of reproduction, development, and polymorphism. According to the climatic conditions and availability of the food plants, they may reproduce either by parthenogenesis, zygogenesis, or pedogenesis. They may either be oviparous or viviparous or both (Singh & Singh, 2022).

In India, very few studies have been conducted to evaluate the biotic potential of spiders against aphid pests, for example, on *Aphis (Aphis) craccivora* Koch, 1854 on cotton (Sebastian & Sudhikumar, 2002), *Aphis (Aphis) gossypii* Glover, 1877 on cotton (Jeyaparvathi *et al.*, 2013), *Aphis (Aphis) pomi* de Geer, 1773 on apple (Khan, 2016), *Lipaphis (Lipaphis) erysimi* (Kaltenbach, 1843) on mustard (Shaikh *et al.*, 2020), and *Myzus (Nectarosiphon) persicae* (Sulzer, 1776) on brassica crops (Anusha *et al.*, 2022).

Most of the studies are concerned with the empirical records of spiders as aphid predators in a particular area. The spiders occupy all the terrestrial ecosystems (Singh *et al.*, 2023a). They are globally distributed and, in general, mostly are entomophagous. However, excessive anthropogenic activities and pollution badly affect their distribution (Prakash & Verma, 2022; Singh *et al.*, 2023b). Information on spider predation on aphids is very limited and need intensive studies. In the present article, the available data of spiders and their aphid preys along with the host plants in different states/union territories of India are compiled.

## Material and Methods

The present checklist is based on the published literature on aphidophagous spiders, e.g. books, book chapters, journals, proceedings of conferences, and a few authentic theses up to June 25, 2024. In most of the recent past literature, there are several errors in the scientific names of the spiders as well as aphids and food plants because of their modified status and other nomenclatural decisions and clarification. The names of aphids, as well as plants that were misspelt in the original records have been corrected where we logically ascertain the intended species. In the present checklist, attempts have been made to provide the valid scientific names of the predators following World Spider Catalog (2024), aphids following Favret (2024), and of the plants, following (World Flora Online, 2024). For synonymy of valid species, above references should be consulted. If a spider species is identified only up to a generic level, it was considered as species only if no other species of that genus is reported within that state.

Table 1. Number of families of aphidophagous spiders, prey (aphid) species, host plant species, number of triplets (predator-prey-host plant) and their distribution in India.

Spider families	Number of spider species	Number of prey (aphid) species	Number of host plant species	Number of triplets	Number of states/union territories
1. Agelenidae	1	1	1	1	1
2. Araneidae	18	27	34	72	11
3. Cheiracanthiidae	2	10	10	10	3
4. Clubionidae	2	11	10	15	7
5. Corinidae	1	1	1	2	1
6. Dictynidae	1	2	1	1	1
7. Eresidae	1	1	1	1	1
8. Linyphiidae	1	2	2	2	2
9. Lycosidae	7	5	8	18	5
10. Oxyopidae	9	8	14	30	13
11. Philodromidae	2	3	4	4	3
12. Salticidae	11	22	23	39	10
13. Tetragnathidae	4	7	9	12	6
14. Theridiidae	4	18	20	22	6
15. Thomisidae	12	18	18	32	6
16. Uloboridae	1	2	3	3	2
17. Unidentified families	3	3	5	5	5
Total	80	53	59	269	20

## Results and Discussion

Table (1) demonstrates that a total of 79 species of spiders are aphidophagous in India belonging to 16 families, Araneidae being the largest one comprising 18 species

under 9 genera followed by Thomisidae (12 species in 9 genera) and Salticidae (11 species in 10 genera), and others having less than 10 species; preying on 53 species of aphids associated with 59 species of plants in 20 states/union territories.

About 41% of the spiders (32 species) preferred *Aphis* (*Aphis*) *gossypii* Glover as prey on only 10 host plant species with 59 triplets (spider-aphid-host plant) in 12 states/union territories of India. Next preferred preys are *Aphis* (*Aphis*) *craccivora* Koch (23 spider species on 6 host plants with 26 triplets in 7 states/union territories) and *Lipaphis* (*Lipaphis*) *erysimi* (Kaltenbach) (12 spider species on 4 host plants with 22 triplets in only 3 states). In India, a total of 269 tritrophic relationships (triplets of predator-prey-food plant) were recorded.

Table 2. Number of aphidophagous spider species, prey (aphid) species, host plant species, triplets (predator-prey-host plant) in different states/union territories of India.

Name of the states	Number of spider species	Number of prey (aphid) species	Number of host plant species	Number of triplets
1. Andhra Pradesh	2	2	2	4
2. Assam	1	1	1	1
3. Chhattisgarh	4	1	2	5
4. Gujarat	15	2	2	16
5. Haryana	1	1	1	1
6. Himachal Pradesh	13	21	13	26
7. Jammu & Kashmir	7	1	1	7
8. Karnataka	1	1	1	1
9. Kerala	3	2	2	6
10. Madhya Pradesh	3	1	1	3
11. Maharashtra	18	7	11	49
12. Manipur	1	1	1	1
13. Odisha	3	1	1	3
14. Rajasthan	1	2	2	2
15. Sikkim	2	3	2	4
16. Tamil Nadu	18	2	4	31
17. Telangana	3	1	1	6
18. Uttar Pradesh	5	2	2	3
19. Uttarakhand	17	27	24	70
20. West Bengal	16	8	13	35
Total	79	53	59	267

In India, the aphidophagous spiders are distributed only in 20 states/union territories. A maximum of 18 species were recorded each from Maharashtra and Tamil Nadu followed by 17 species from Uttarakhand, 15 species each from Gujarat and West Bengal, 13 species from Himachal Pradesh, and less than 10 species were recorded from other states/union territories (Table 2). No species of aphidophagous spiders is recorded from 10 states and 7 union territories of India. Indeed, no survey was conducted in these regions and hence, it requires an extensive survey in these regions of India. Most of the surveys were conducted in Gujarat, Himachal Pradesh, Maharashtra, Tamil Nadu, Uttarakhand and West Bengal.

Following is the detailed list of these spiders along with their aphid preys and food plants recorded from different states/union territories of India:

**A. Family Agelenidae:** The members of this family are commonly known as funnel web spiders or funnel weaver or sheet-web spiders. Most of them are nocturnal and are good ambusher and waits in a concealed position to launch a surprise attack on preys or any

invaders (Singh *et al.*, 2021a). Record of an unidentified *Agelena* sp. feeding on unidentified aphid on unidentified food plant recorded in Maharashtra (Patil *et al.*, 2018) seems to be doubtful (?).

**B. Family Araneidae:** These spiders are globally distributed and commonly known as the orb-weaver spiders as they build spiral wheel-shaped webs in the houses, gardens, tree branches, tall grasses, agricultural fields, and bushes. They are typically nocturnal and most active during evening hours and hide themselves in the middle of the webs hanging upside down during the daytime (Singh & Singh, 2021b). In agricultural fields, few species of these spiders are found in their webs. In India, 18 species of spiders of this family are recorded preying on 27 species of aphids feeding on 34 food plants in 11 states as mentioned below.

**1. *Araneus* sp.**

*Aphis (Aphis) gossypii* Glover, 1877

*Benincasa hispida* Cogn. – Chhattisgarh (Bisen *et al.*, 2017)

*Capsicum frutescens* L. – Sikkim (Raychaudhuri *et al.*, 1978)

*Aphis (Aphis) pomi* de Geer, 1773

*Malus domestica* (Suckow) Borkh. (syn. *Pyrus malus* L.) – Jammu & Kashmir (Bhagat *et al.*, 1988)

*Aphis (Toxoptera) citricidus* (Kirkaldy, 1907)

*Citrus* sp. – Maharashtra (Kale *et al.*, 2020)

*Capitophorus formosartemisiae* (Takahashi, 1921)

*Artemisia* sp. – Himachal Pradesh (Das & Raychaudhuri, 1983)

*Cinara (Cinara) comata* Doncaster, 1956

*Pinus* sp. – Himachal Pradesh (Agarwala *et al.*, 1981)

*Macrosiphum (Macrosiphum) rosae* (Linnaeus, 1758)

*Rosa* sp. – Sikkim (Raychaudhuri *et al.*, 1978); West Bengal (Debnath, 2020)

*Sitobion (Sitobion) rosaeiformis* (Das, 1918)

*Rosa* sp. – Sikkim (Raychaudhuri *et al.*, 1978); West Bengal (Debnath, 2020)

**2. *Araniella nympha* (Simon, 1889)**

*Acyrtosiphon (Acyrtosiphon) rubi* Narzikulov, 1957

*Rubus ellipticus* Sm. – Uttarakhand (Debnath, 1991)

*Sitobion (Sitobion) miscanthi* (Takahashi, 1921)

*Triticum aestivum* L. – Uttarakhand (Debnath, 1991)

*Tumoranuraphis indica* (Chakrabarti & Maity, 1984)

*Prunus cornuta* (Wall. ex Royle) Steud. – Uttarakhand (Debnath, 1991)

**3. *Argiope anasuja* Thorell, 1887**

Unidentified aphid – Maharashtra (Patil *et al.*, 2018)

**4. *Argiope catenulata* (Doleschall, 1859)**

*Aphis (Aphis) gossypii* Glover, 1877

*Gossypium hirsutum* L. – Tamil Nadu (Mathirajan & Reghupathy, 2003)

**5. *Argiope luzona* (Walckenaer, 1841)**

*Aphis (Aphis) gossypii* Glover, 1877

*Solanum melongena* L. – Tamil Nadu (Sankari & Thiyagesan, 2010)

*Trichosanthes cucumerina* L. – Tamil Nadu (Sankari & Thiyagesan, 2010)

**6. *Argiope minuta* Karsch, 1879**

*Aphis (Aphis) gossypii* Glover, 1877

5 *Gossypium hirsutum* L. – Tamil Nadu (Kannan *et al.*, 2004)

**7. *Argiope pulchella* Thorell, 1881**

*Aphis (Aphis) gossypii* Glover, 1877

- Gossypium hirsutum* L. – Tamil Nadu (Vanitha *et al.*, 2009)
- 8. *Bijoaraneus mitificus*** (Simon, 1886)  
Unidentified plant – Maharashtra (Patil *et al.*, 2018)
- 9. *Cyclosa insulana*** (Costa, 1834)  
*Aphis* (*Aphis*) *craccivora* Koch, 1854  
*Vicia faba* L. – West Bengal (Raychaudhuri *et al.*, 1979; Debnath, 2020)
- 10. *Cyclosa* sp.**  
*Sitobion* (*Sitobion*) *rosaeiformis* (Das, 1918)  
*Rosa* sp. – Sikkim (Raychaudhuri *et al.*, 1978); West Bengal (Raychaudhuri *et al.*, 1978)
- 11. *Cyrtophora cicatrosa*** (Stoliczka, 1869)  
*Aphis* (*Aphis*) *gossypii* Glover, 1877  
*Solanum melongena* L. – Tamil Nadu (Sankari & Thiyagesan, 2010)  
*Trichosanthes cucumerina* L. – Tamil Nadu (Sankari & Thiyagesan, 2010)  
*Aphis* (*Toxoptera*) *citricidus* (Kirkaldy, 1907)  
*Citrus* sp. – Maharashtra (Kale *et al.*, 2020)  
*Rhopalosiphum padi* (Linnaeus, 1758)  
*Triticum aestivum* L. – Uttar Pradesh (Mishra & Rastogi, 2020)
- 12. *Eriovixia* sp.**  
*Aphis* (*Aphis*) *gossypii* Glover, 1877  
*Abelmoschus esculentus* Moench – Maharashtra (Kale *et al.*, 2020)  
*Gossypium hirsutum* L. – Maharashtra (Kale *et al.*, 2020)  
*Helianthus annuus* L. – Maharashtra (Kale *et al.*, 2020)  
*Aphis* (*Toxoptera*) *citricidus* (Kirkaldy, 1907)  
*Citrus* sp. – Maharashtra (Kale *et al.*, 2020)  
*Hysteroneura setariae* (Thomas, 1878)  
*Triticum aestivum* L. – Maharashtra (Kale *et al.*, 2020)  
*Lipaphis* (*Lipaphis*) *erysimi* (Kaltenbach, 1843)  
*Brassica rapa* L. – Maharashtra (Kale *et al.*, 2020)  
*Rhopalosiphum maidis* (Fitch, 1856)  
*Sorghum bicolor* (L.) Moench – Maharashtra (Kale *et al.*, 2020)  
*Uroleucon* (*Uromelan*) *compositae* (Theobald, 1915)  
*Carthamus tinctorius* L. – Maharashtra (Raychaudhuri *et al.*, 1979; Kale *et al.*, 2020)
- 13. *Neoscona elliptica*** Tikader & Bal, 1981  
*Myzus* (*Myzus*) *dycei* Carver, 1961  
*Urtica dioica* L. – Uttarakhand (Debnath, 1991)
- 14. *Neoscona mukerjei*** Tikader, 1980  
*Aphis* (*Aphis*) *craccivora* Koch, 1854  
*Vigna unguiculata* (L.) Walp. – Kerala (Manu, 2005)  
*Aphis* (*Aphis*) *gossypii* Glover, 1877  
*Abelmoschus esculentus* Moench – Kerala (Manu, 2005)  
*Aphis* (*Aphis*) *kurosawai* Takahashi, 1921  
*Artemisia vulgaris* L. – Uttarakhand (Debnath, 1991)  
*Aphis* (*Aphis*) *pomi* de Geer, 1773  
*Malus domestica* (Suckow) Borkh. – Jammu & Kashmir (Khan, 2009)  
*Sitobion* (*Sitobion*) *miscanthi* (Takahashi, 1921)  
*Triticum aestivum* L. – Uttarakhand (Debnath, 1991)
- 15. *Neoscona nautica*** (L. Koch, 1875)  
*Macrosiphum* (*Macrosiphum*) *rosae* (Linnaeus, 1758)

- Rosa* sp. – West Bengal (Raychaudhuri *et al.*, 1979; Kale *et al.*, 2020)  
*Sitobion* (*Sitobion*) *rosaeiformis* (Das, 1918)  
*Rosa* sp. – West Bengal (Debnath, 2020)
- 16. *Neoscona shillongensis*** Tikader & Bal, 1981  
*Aphis* (*Aphis*) *pomi* de Geer, 1773  
*Malus domestica* (Suckow) Borkh. – Jammu & Kashmir (Khan, 2016)
- 17. *Neoscona theisi*** (Walckenaer, 1841)  
*Aphis* (*Aphis*) *gossypii* Glover, 1877  
*Abelmoschus esculentus* Moench – Chhattisgarh (Chaturvedi *et al.*, 2023)  
*Benincasa hispida* Cogn. – Chhattisgarh (Bisen *et al.*, 2017)  
*Gossypium hirsutum* L. – Maharashtra (Nagrare *et al.*, 2015); Tamil Nadu (Kannan *et al.*, 2004; Mathirajan & Reghupathy, 2003); Telangana – (Mallesh & Sravanthy, 2021)  
*Rhopalosiphum padi* (Linnaeus, 1758)  
*Triticum aestivum* L. – Uttar Pradesh (Mishra & Rastogi, 2020)
- 18. *Neoscona vigilans*** (Blackwall, 1865) [syn. *Neoscona rumpfi* Thorell, 1878]  
*Myzus* (*Myzus*) *dycei* Carver, 1961  
*Urtica parviflora* Roxb. – Himachal Pradesh (Das & Raychaudhuri, 1983)
- 19. *Neoscona* sp.**  
*Aphis* (*Aphis*) *craccivora* Koch, 1854  
*Arachis hypogaea* L – Tamil Nadu (Abarna, 2020)  
*Lablab purpureus* (L.) Sweet ssp. *purpureus* – Maharashtra (Kale *et al.*, 2020)  
*Aphis* (*Aphis*) *gossypii* Glover, 1877  
*Abelmoschus esculentus* Moench – Maharashtra (Kale *et al.*, 2020)  
*Gossypium hirsutum* L. – Andhra Pradesh (Dhillon & Sharma, 2013); Maharashtra (Kale *et al.*, 2020)  
*Helianthus annuus* L. – Maharashtra (Kale *et al.*, 2020)  
*Aphis* (*Toxoptera*) *citricidus* (Kirkaldy, 1907)  
*Citrus* sp. – Maharashtra (Kale *et al.*, 2020)  
*Brachycaudus* (*Brachycaudus*) *helichrysi* (Kaltenbach, 1843)  
*Prunus persica* (L.) Batsch – Uttarakhand (Debnath, 1991)  
*Capitophorus formosartemisiae* (Takahashi, 1921)  
*Artemisia vulgaris* L. – Uttarakhand (Debnath, 1991)  
*Chaitophorus kapuri* Hille Ris Lambers, 1966  
*Populus* sp. – Himachal Pradesh (Das & Raychaudhuri, 1983)  
*Hysteroneura setariae* (Thomas, 1878)  
*Triticum aestivum* L. – Maharashtra (Kale *et al.*, 2020)  
*Liosomaphis himalayensis* Basu, 1964  
*Berberis aristata* DC. – Uttarakhand (Debnath, 1991)  
*Berberis* sp. – Himachal Pradesh (Das & Raychaudhuri, 1983)  
*Lipaphis* (*Lipaphis*) *erysimi* (Kaltenbach, 1843)  
*Brassica rapa* L. – Uttarakhand (Debnath, 1991); Maharashtra (Kale *et al.*, 2020)  
*Megoura dooarsis* (Ghosh & Raychaudhuri, 1969)  
Indet Fabaceae – Himachal Pradesh (Das & Raychaudhuri, 1983)  
*Metopolophium* sp.  
*Spiraea canescens* D. Don – Himachal Pradesh (Das & Raychaudhuri, 1983)  
*Myzus* (*Myzus*) *dycei* Carver, 1961  
*Urtica dioica* L. – Uttarakhand (Debnath, 1991)



*Myzus (Nectarosiphon) persicae* (Sulzer, 1776)  
*Solanum tuberosum* L. – West Bengal (Nayak *et al.*, 2019)  
*Prociphilus* sp.  
*Lonicera quinquelocularis* Hardw. – Uttarakhand (Debnath, 1991)  
*Rhopalosiphum maidis* (Fitch, 1856)  
*Sorghum bicolor* (L.) Moench – Maharashtra (Kale *et al.*, 2020)  
*Sappaphis* sp.  
*Cotoneaster bacillaris* Wall. ex Lindl. – Uttarakhand (Debnath, 1991)  
*Schoutedenia emblica* (Patel & Kulkarni, 1952)  
*Phyllanthus emblica* L. – Uttar Pradesh (Singh *et al.*, 2018)  
*Sitobion (Sitobion) miscanthi* (Takahashi, 1921)  
*Triticum aestivum* L. – Uttarakhand (Debnath, 1991)  
*Uroleucon (Uromelan) compositae* (Theobald, 1915)  
*Carthamus tinctorius* L. – Maharashtra (Kale *et al.*, 2020)

**C. Family Cheiracanthiidae:** The members of this family are commonly known as yellow sac spiders which typically build flat silk sacs at the place where they rest most of the daytime. They are active foragers and they search for prey rather than capture it within a web as they never spin web (Singh *et al.*, 2020). In India, 34 species of spiders of this family are recorded in 25 states and 5 union territories (Singh *et al.*, 2023a), but only 2 identified and few unidentified species of the genus *Cheiracanthium* were observed as aphidophagous on 10 aphid species feeding on 10 food plants 3 states/union territories as mentioned below.

**1. *Cheiracanthium himalayense*** Gravely, 1931

*Aphis (Aphis) pomi* de Geer, 1773  
*Malus domestica* (Suckow) Borkh. – Jammu & Kashmir (Khan, 2009)

**2. *Cheiracanthium melanostomum*** (Thorell, 1895)

*Aphis (Aphis) craccivora* Koch, 1854  
*Gossypium hirsutum* L. – Gujarat (Sebastian & Sudhikumar, 2002)

**3. *Cheiracanthium* sp.**

*Aphis (Aphis) clematidis* Koch, 1854  
*Clematis buchananiana* Wall. – Uttarakhand (Debnath, 1991)  
*Eriosoma lanigerum* (Hausmann, 1802)  
*Malus domestica* (Suckow) Borkh. – Uttarakhand (Debnath, 1991)  
*Liosomaphis himalayensis* Basu, 1964  
*Berberis aristata* DC. – Uttarakhand (Debnath, 1991)  
*Melanaphis nr. arundinariae* (Takahashi, 1937)  
*Pyrus pashia* Buch.–Ham. ex D. Don – Uttarakhand (Debnath, 1991)  
*Pemphigus (Pemphigus) mordwilkoii* Cholodkovsky, 1912  
*Populus ciliata* Wall. ex Royle – Uttarakhand (Debnath, 1991)  
*Prociphilus* sp.  
*Lonicera quinquelocularis* Hardw. – Uttarakhand (Debnath, 1991)  
*Sappaphis* sp.  
*Cotoneaster bacillaris* Wall. ex Lindl. – Uttarakhand (Debnath, 1991)  
*Sitobion (Sitobion) miscanthi* (Takahashi, 1921)  
*Triticum aestivum* L. – Uttarakhand (Debnath, 1991)

**D. Family Clubionidae:** The family Clubionidae, commonly known as sac spiders, do not spin web and construct flattened tubular dense white retreats that often had two openings, usually made on rolled leaves. Mostly they are nocturnal hunters and capture

the prey by suddenly jumping upon it and grabbing it with their stout toothed chelicerae. These sac spiders are one of the common predators of insect pests in the crop fields and gardens (Singh BB *et al.*, 2020). In India, 34 species of the spiders of this family are recorded in 22 states and 4 union territories (Singh *et al.*, 2023a), however, only two identified and few unidentified species of the genus *Clubiona* were observed as aphidophagous on 11 aphid species feeding on 10 food plants in 7 states.

**1. *Clubiona drassodes* O. Pickard-Cambridge, 1874**

*Aphis (Aphis) gossypii* Glover, 1877

*Gossypium hirsutum* L. – Tamil Nadu (Vanitha *et al.*, 2009)

**2. *Clubiona filicata* O. Pickard-Cambridge, 1874 (syn. *Clubiona pashabhaiti* Patel & Patel, 1973)**

*Aphis (Aphis) craccivora* Koch, 1854

*Gossypium hirsutum* L. – Gujarat (Sebastian & Sudhikumar, 2002)

**3. *Clubiona* sp.**

*Aphis (Aphis) gossypii* Glover, 1877

*Gossypium hirsutum* L. – Andhra Pradesh (Dhillon & Sharma, 2013); –  
Maharashtra (Kale *et al.*, 2020)

*Helianthus annuus* L. – Maharashtra (Kale *et al.*, 2020)

Unidentified plant – Himachal Pradesh (Das & Raychaudhuri, 1983)

*Aspidophorodon (Eoessigia) indicum* (David, Rajasingh & Narayanan, 1972)

*Cotoneaster bacillaris* Wall. ex Lindl. – Uttarakhand (Debnath, 1991)

*Brachycaudus (Brachycaudus) helichrysi* (Kaltenbach, 1843)

*Erigeron bonariensis* L. – Uttarakhand (Debnath, 1991)

*Prunus persica* (L.) Batsch – Uttarakhand (Debnath, 1991)

*Brevicoryne brassicae* (Linnaeus, 1758)

*Brassica oleracea* L. var *botrytis* – Uttar Pradesh (Singh *et al.*, 2016)

*Macrosiphoniella (Macrosiphoniella) sanborni* (Gillette, 1908)

*Chrysanthemum* sp. – Himachal Pradesh (Das & Raychaudhuri, 1983)

*Myzus (Myzus) ornatus* (Laing, 1932)

Unidentified plant – Himachal Pradesh (Agarwala *et al.*, 1981)

*Prociphilus* sp.

*Lonicera quinquelocularis* Hardw. – Uttarakhand (Debnath, 1991)

*Sappaphis* sp.

*Cotoneaster bacillaris* Wall. ex Lindl. – Uttarakhand (Debnath, 1991)

*Schoutedenia emblica* (Patel & Kulkarni, 1952)

*Phyllanthus emblica* L. – Uttar Pradesh (Singh *et al.*, 2018)

*Tumoranuraphis indica* (Chakrabarti & Maity, 1984)

*Prunus cornuta* (Wall. ex Royle) Steud. – Uttarakhand (Debnath, 1991)

**E. Family Corinnidae:** The members of the family Corinnidae are commonly called as corinnid sac spiders. They are hunters and build silken retreats, or sacs, usually on plant terminals, between leaves, under bark or under rocks. The family is distributed in 16 Indian states and 3 union territories (Singh *et al.*, 2021a). Only one species, *Castianeira* sp. feeding on *Aphis (Aphis) gossypii* Glover, 1877 infesting *Gossypium hirsutum* L. is recorded in Gujarat (Dhulia & Yadav, 1991).

**F. Family Dictynidae:** Dictynids are commonly known as mesh-weavers usually spin irregular and complex web on the tops of small bushes or the dry standing remains of weeds, making a tangle of silken fibers, sometimes with zigzag lines (Sharma *et al.*, 2021). In India, only 15 species are reported from 13 states and 3 union territories (Singh

*et al.*, 2023a), but only an unidentified species of the type genus *Dictyna* is recorded as aphidophagous on 2 aphid species in Himachal Pradesh as given below.

**1. *Dictyna* sp.**

*Chaetosiphon (Pentatrachopus) tetrarhodum* (Walker, 1849)

*Rosa* sp. – Himachal Pradesh (Das & Raychaudhuri, 1983)

*Sitobion (Sitobion) rosaeiformis* (Das, 1918)

*Rosa* sp. – Himachal Pradesh (Agarwala *et al.*, 1981)

**G. Family Eresidae:** The family Eresidae, commonly known as velvet spiders, is a small group of spiders and typically build very large silken nests in vegetation in which hundreds of individuals live together (Tikader & Biswas, 1981). In India, only 5 species of a single genus *Stegodyphus* are reported from 17 states and 3 union territories (Sharma *et al.*, 2021), however, only one species, *Stegodyphus sarasinorum* Karsch, 1892 is recorded as aphidophagous on *Rhopalosiphum padi* (Linnaeus, 1758) infesting *Triticum aestivum* L. in Uttar Pradesh (Mishra & Rastogi, 2020).

**H. Family Linyphiidae:** The spiders of this family are commonly known as sheet weavers, or money spiders and are distributed in the temperate regions. They construct a sheet web sometimes dome shaped at ground level but they may inhabit a very wide array of habitats. Their webs do not have retreat and the spider always hang inverted below the sheet (Sharma *et al.*, 2020). In India, 83 species are recorded (Singh *et al.*, 2023a), out of which, only an unidentified species of the type genus *Linyphia* is recorded as aphidophagous as given below.

**1. *Linyphia* sp.**

*Hyalopterus pruni* (Geoffroy, 1762)

*Phragmites karka* (Retz.) Trin. ex Steud. – Manipur (Raychaudhuri *et al.*, 1978)

*Taoia indica* (Ghosh & Raychaudhuri, 1972)

*Alnus nepalensis* D. Don – West Bengal (Raychaudhuri *et al.*, 1979; Debnath, 2020)

**I. Family Lycosidae:** The members of this family are commonly called as wolf spiders. Mostly, they are diurnal and do not spin webs for capturing prey, but they run about in grass, leaf litter, over sandy or stony areas, across the surface of the water and many other places and hunt the prey actively (Singh, 2021a). In India, 147 species are known (Singh *et al.*, 2023a) which are distributed widely. However, only 7 species are aphidophagous preying on 5 species of aphids infesting 8 food plants in 5 states/union territories as mentioned below.

**1. *Hippasa pantherina* Pocock, 1899**

*Aphis (Aphis) gossypii* Glover, 1877

*Solanum melongena* L. – Tamil Nadu (Sankari & Thiyagesan, 2010)

*Trichosanthes cucumerina* L. – Tamil Nadu (Sankari & Thiyagesan, 2010)

**2. *Lycosa poonaensis* Tikader & Malhotra, 1980**

*Aphis (Aphis) craccivora* Koch, 1854

*Gossypium hirsutum* L. – Gujarat (Sebastian & Sudhikumar, 2002)

**3. *Lycosa tista* Tikader, 1970**

*Aphis (Aphis) craccivora* Koch, 1854

*Gossypium hirsutum* L. – Gujarat (Sebastian & Sudhikumar, 2002)

**4. *Pardosa altitudis* Tikader & Malhotra, 1980**

*Aphis (Aphis) pomi* de Geer, 1773

- Malus domestica* (Suckow) Borkh. – Jammu & Kashmir (Khan, 2016)
5. ***Pardosa pseudoannulata*** (Bösenberg & Strand, 1906) [syn. *Lycosa pseudoannulata* Fox, 1935]  
*Aphis* (*Aphis*) *gossypii* Glover, 1877  
*Gossypium hirsutum* L. – Tamil Nadu (Kannan *et al.*, 2004)  
*Solanum melongena* L. – Tamil Nadu (Sankari & Thiyagesan, 2010); West Bengal (Satpathi, 1999)  
*Trichosanthes cucumerina* L. – Tamil Nadu (Sankari & Thiyagesan, 2010)  
*Lipaphis* (*Lipaphis*) *erysimi* (Kaltenbach, 1843)  
*Brassica oleracea* L. – Maharashtra (Shaikh *et al.*, 2020)  
*Brassica rapa* L. – Maharashtra (Shaikh *et al.*, 2020)  
*Raphanus sativus* L. – Maharashtra (Shaikh *et al.*, 2020)
6. ***Pardosa sumatrana*** (Thorell, 1890)  
*Aphis* (*Aphis*) *craccivora* Koch, 1854  
*Gossypium hirsutum* L. – Gujarat (Sebastian & Sudhikumar, 2002)
7. ***Pardosa* sp.**  
*Aphis* (*Aphis*) *gossypii* Glover, 1877  
*Solanum melongena* L. – West Bengal (Satpathi, 1999)
8. ***Wadicosa fidelis*** (O. Pickard-Cambridge, 1872)  
*Aphis* (*Aphis*) *craccivora* Koch, 1854  
*Gossypium hirsutum* L. – Gujarat (Sebastian & Sudhikumar, 2002)  
*Lipaphis* (*Lipaphis*) *erysimi* (Kaltenbach, 1843)  
*Brassica oleracea* L. – Maharashtra (Shaikh *et al.*, 2020)  
*Brassica rapa* L. – Maharashtra (Shaikh *et al.*, 2020)  
*Raphanus sativus* L. – Maharashtra (Shaikh *et al.*, 2020)
9. **Unidentified species**  
*Myzus* (*Nectarosiphon*) *persicae* (Sulzer, 1776)  
*Brassica oleracea* L. *capitata* – West Bengal (Anusha *et al.*, 2022)

**J. Family Oxyopidae:** The Oxyopidae, commonly called as lynx spiders, are tropical in distribution. Most of the *Oxyopes* species have cryptic colour to blend in with the vegetation and actively search for prey, stalk and often leap from branch to leaf and finally jumping on its prey like cats or leaping a few centimetres into the air to catch flying insects. The lynx spiders are abundant enough to be important in agricultural systems as biological control agents; it is particularly common in cotton, soybean, grain sorghum, and alfalfa and feeds on a wide range of pest species (Singh, 2021b). At present, 98 species are recorded from India (Singh *et al.*, 2023a), out of which, only 9 species are known to prey on 8 species of aphids infesting 14 species of host plants in 13 states as mentioned below.

1. ***Oxyopes birmanicus*** Thorell, 1887  
*Aphis* (*Aphis*) *craccivora* Koch, 1854  
*Vigna unguiculata* (L.) Walp. – Madhya Pradesh (Upadhyay *et al.*, 2020)  
*Aphis* (*Aphis*) *gossypii* Glover, 1877  
*Gossypium hirsutum* L. – Tamil Nadu (Jeyaparthvi *et al.*, 2013)
2. ***Oxyopes chittrae*** Tikader, 1965  
*Aphis* (*Aphis*) *craccivora* Koch, 1854  
*Gossypium hirsutum* L. – Gujarat (Sebastian & Sudhikumar, 2002)
3. ***Oxyopes hindostanicus*** Pocock, 1901 [syn. *Oxyopes pankaji* Gajbe & Gajbe, 2000]  
*Aphis* (*Aphis*) *gossypii* Glover, 1877  
*Gossypium hirsutum* L. – Maharashtra (Nagrare *et al.*, 2015; Kale *et al.*, 2020)

- Rhopalosiphum maidis* (Fitch, 1856)  
*Sorghum bicolor* (L.) Moench – Maharashtra (Kale *et al.*, 2020)
- 4. *Oxyopes javanus*** Thorell, 1887  
*Aphis* (*Aphis*) *craccivora* Koch, 1854  
*Vigna unguiculata* (L.) Walp. – Kerala (Manu, 2005)  
*Aphis* (*Aphis*) *gossypii* Glover, 1877  
*Abelmoschus esculentus* Moench – Kerala (Manu, 2005)  
*Gossypium hirsutum* L. – Tamil Nadu (Kannan *et al.*, 2004; Mathirajan & Reghupathy, 2003)  
*Solanum melongena* L. – Tamil Nadu (Vanitha *et al.*, 2009; Sankari & Thiyagesan, 2010)  
*Trichosanthes cucumerina* L. – Tamil Nadu (Sankari & Thiyagesan, 2010)  
*Lipaphis* (*Lipaphis*) *erysimi* (Kaltenbach, 1843)  
*Brassica juncea* (L.) Czern. – West Bengal (Ghosh, 1983)  
*Brassica* sp. – West Bengal (Agarwala *et al.*, 1981)
- 5. *Oxyopes lineatipes*** (C.L. Koch, 1847)  
*Aphis* (*Aphis*) *gossypii* Glover, 1877  
*Solanum melongena* L. – Tamil Nadu (Sankari & Thiyagesan, 2010)  
*Trichosanthes cucumerina* L. – Tamil Nadu (Sankari & Thiyagesan, 2010)
- 6. *Oxyopes salticus*** Hentz, 1845  
*Aphis* (*Aphis*) *gossypii* Glover, 1877  
*Gossypium hirsutum* L. – Tamil Nadu (Jeyaparvathi *et al.*, 2013)  
*Aphis* (*Aphis*) *craccivora* Koch, 1854  
*Gossypium hirsutum* L. – Gujarat (Sebastian & Sudhikumar, 2002)
- 7. *Oxyopes shweta*** Tikader, 1970  
*Aphis* (*Aphis*) *craccivora* Koch, 1854  
*Gossypium hirsutum* L. – Gujarat (Sebastian & Sudhikumar, 2002)
- 8. *Oxyopes* sp.**  
*Aphis* (*Aphis*) *craccivora* Koch, 1854  
*Arachis hypogaea* L. – Tamil Nadu (Abarna, 2020)  
*Aphis* (*Aphis*) *gossypii* Glover, 1877  
*Benincasa hispida* Cogn. – Chhattisgarh (Bisen *et al.*, 2017)  
5 *Solanum melongena* L. – Assam (Borkakati *et al.*, 2019); Odisha (Singh *et al.*, 2023)  
*Aphis* (*Toxoptera*) *aurantii* Boyer de Fonsc., 1841  
*Camellia sinensis* (L.) Kuntze – Himachal Pradesh (Sharma & Kashyap, 2002)  
*Brevicoryne brassicae* (Linnaeus, 1758)  
*Brassica oleracea* L. var *botrytis* – Uttar Pradesh (Singh *et al.*, 2016)  
*Myzus* (*Nectarosiphon*) *persicae* (Sulzer, 1776)  
*Solanum tuberosum* L. – West Bengal (Nayak *et al.*, 2019)  
*Schoutedenia emblica* (Patel & Kulkarni, 1952)  
*Phyllanthus emblica* L. – Uttar Pradesh (Singh *et al.*, 2018)
- 9. *Peuceitia latikae*** Tikader, 1970  
*Aphis* (*Aphis*) *gossypii* Glover, 1877  
*Gossypium hirsutum* L. – Tamil Nadu (Jeyaparvathi *et al.*, 2013)
- 10. *Peuceitia viridana*** (Stoliczka, 1869)  
*Aphis* (*Aphis*) *craccivora* Koch, 1854  
*Vigna radiata* (L.) R. Wilczek – Rajasthan (Shukla & Tiwari, 2024)  
*Aphis* (*Aphis*) *gossypii* Glover, 1877

*Gossypium hirsutum* L. – Tamil Nadu (Mathirajan & Reghupathy, 2003; Jeyaparthi *et al.*, 2013); Telangana (Mallesh & Sravanthy, 2021)  
*Solanum melongena* L. – Tamil Nadu (Sankari & Thiyagesan, 2010)  
*Trichosanthes cucumerina* L. – Tamil Nadu (Sankari & Thiyagesan, 2010)

## 11. Unidentified species

*Myzus (Nectarosiphon) persicae* (Sulzer, 1776)

*Brassica oleracea* L. *capitata* – West Bengal (Anusha *et al.*, 2022)

**K. Family Philodromidae:** Philodromidae spiders are commonly known as false crab spiders, running crab spiders, house crab spiders etc. Most species live in the foliage, branches, stems of bushes and trees and even found running about at ground level. They do not construct webs but use silk for draglines which are used to drop from their perch and hang in the air (Singh & Singh, 2021c). At present, 48 species are known from India out of which only 2 species were recorded as aphid predators preying on only 3 aphid species infesting 4 food plants in only 3 states as mentioned below.

### 1. *Philodromus decoratus* Tikader, 1962

*Brevicoryne brassicae* (Linnaeus, 1758)

*Raphanus sativus* L. – Himachal Pradesh (Das & Raychaudhuri, 1983)

### 2. *Philodromus* sp.

Unidentified aphid

*Pinus* sp. – Himachal Pradesh (Agarwala *et al.*, 1981)

### 3. *Tibellus oblongus* (Walckenaer, 1802)

*Myzus (Nectarosiphon) persicae* (Sulzer, 1776)

5 *Solanum tuberosum* L. – West Bengal (Nayak *et al.*, 2019)

### 4. *Tibellus* sp.

*Sitobion (Sitobion) rosaeiformis* (Das, 1918)

*Rosa* sp. – Uttarakhand (Debnath, 1991)

**L. Family Salticidae:** Salticidae includes jumping spiders and is the largest family of the order Araneae. In general, they do not construct web to capture prey, instead, they are master hunters, with the ability to jump vast distances feeding a large variety of preys (Singh *et al.*, 2021b). At present, 351 species of Salticidae are known from India (Singh *et al.*, 2023a) but only 11 species are known to prey 22 species of aphids infesting 23 species of plants in 10 states as mentioned below.

### 1. *Carrhotus viduus* (C.L. Koch 1846)

Unidentified aphid

*Capsicum* sp. – Karnataka (Hill *et al.*, 2021)

### 2. *Hyllus semicupreus* (Simon, 1885)

*Aphis (Aphis) craccivora* Koch, 1854

*Vigna unguiculata* (L.) Walp. – Madhya Pradesh (Upadhyay *et al.*, 2018a)

*Rhopalosiphum maidis* (Fitch, 1856)

*Sorghum bicolor* (L.) Moench – Maharashtra (Kale *et al.*, 2020)

### 3. *Marpissa* sp.

*Acyrtosiphon (Acyrtosiphon) rubi* Narzikulov, 1957

*Rubus ellipticus* Sm. – Uttarakhand (Debnath, 1991)

*Aphis (Aphis) gossypii* Glover, 1877

*Solanum melongena* L. – Odisha (Singh *et al.*, 2023)

*Aphis (Aphis) kurosawai* Takahashi, 1921

*Artemisia* sp. – Uttarakhand (Debnath, 1991)

*Chaitophorus kapuri* Hille Ris Lambers, 1966

- Populus ciliata* Wall. ex Royle – Uttarakhand (Debnath, 1991)  
*Cinara* (*Cupressobium*) *tujafilina* (del Guercio, 1909)  
*Cupressus* sp. – West Bengal (Raychaudhuri *et al.*, 1979; Debnath, 2020)  
*Epipemphigus imaicus* (Cholodkovsky, 1912)  
*Populus ciliata* Wall. ex Royle – Uttarakhand (Debnath, 1991)  
*Eriosoma lanigerum* (Hausmann, 1802)  
*Malus domestica* (Suckow) Borkh. – Uttarakhand (Debnath, 1991)  
*Liosomaphis himalayensis* Basu, 1964  
*Berberis aristata* DC. – Uttarakhand (Debnath, 1991)  
*Lipaphis* (*Lipaphis*) *erysimi* (Kaltenbach, 1843)  
*Brassica rapa* L. – Uttarakhand (Debnath, 1991)  
*Melanaphis* nr. *arundinariae* (Takahashi, 1937)  
*Pyrus pashia* Buch.–Ham. ex D. Don – Uttarakhand (Debnath, 1991)  
*Mollitrichosiphum* sp.  
*Alnus nepalensis* D. Don – Uttarakhand (Debnath, 1991)  
*Pemphigus* (*Pemphigus*) *mordwilkoii* Cholodkovsky, 1912  
*Populus ciliata* Wall. ex Royle – Uttarakhand (Debnath, 1991)  
*Sitobion* (*Sitobion*) *miscanthi* (Takahashi, 1921)  
*Triticum aestivum* L. – Uttarakhand (Debnath, 1991)
- 4. *Myrmarachne* sp.**  
*Brachycaudus* (*Brachycaudus*) *helichrysi* (Kaltenbach, 1843)  
*Erigeron bonariensis* L. – Uttarakhand (Debnath, 1991)  
*Capitophorus formosartemisiae* (Takahashi, 1921)  
*Artemisia vulgaris* L. – Uttarakhand (Debnath, 1991)
- 5. *Phidippus* sp.**  
*Aphis* (*Aphis*) *gossypii* Glover, 1877  
*Solanum melongena* L. – Odisha (Singh *et al.*, 2023)  
*Sitobion* (*Sitobion*) *miscanthi* (Takahashi, 1921)  
*Triticum aestivum* L. – Uttarakhand (Debnath, 1991)
- 6. *Phintella vittata*** (C.L. Koch, 1846) [syn. *Salticus ranjitus* Tikader, 1967]  
*Lipaphis* (*Lipaphis*) *erysimi* (Kaltenbach, 1843)  
*Brassica juncea* (L.) Czern. – West Bengal (Ghosh, 1983)  
*Brassica* sp. – West Bengal (Agarwala *et al.*, 1981)
- 7. *Plexippus paykulli*** (Audouin, 1825)  
*Aphis* (*Aphis*) *craccivora* Koch, 1854  
*Gossypium hirsutum* L. – Gujarat (Sebastian & Sudhikumar, 2002)  
*Lipaphis* (*Lipaphis*) *erysimi* (Kaltenbach, 1843)  
*Brassica oleracea* L. – Maharashtra (Shaikh *et al.*, 2020)  
*Brassica rapa* L. – Maharashtra (Shaikh *et al.*, 2020)  
*Raphanus sativus* L. – Maharashtra (Shaikh *et al.*, 2020)
- 8. *Plexippus* sp.**  
*Brevicoryne brassicae* (Linnaeus, 1758)  
*Brassica rapa* L. – Uttarakhand (Debnath, 1991)  
*Eriosoma lanigerum* (Hausmann, 1802)  
*Malus domestica* (Suckow) Borkh. – Uttarakhand (Debnath, 1991)
- 9. *Rhene flavigera*** (C.L. Koch, 1846) [syn. *Rhene khandalaensis* Tikader, 1977]  
*Macrosiphum* (*Macrosiphum*) *rosae* (Linnaeus, 1758)  
*Rosa* sp. – West Bengal (Raychaudhuri *et al.*, 1978; Debnath, 2020)
- 10. *Rhene* sp.**  
*Aphis* (*Aphis*) *gossypii* Glover, 1877

*Gossypium hirsutum* L. – Telangana (Malleth & Sravanthy, 2021)

**11. *Salicis* sp.**

*Aphis (Aphis) gossypii* Glover, 1877

*Gossypium hirsutum* L. – Tamil Nadu (Vanitha *et al.*, 2009)

**12. *Telamonia dimidiata* (Simon, 1899) (syn. *Phidippus pateli* Tikader, 1974)**

*Aphis (Aphis) craccivora* Koch, 1854

*Gossypium hirsutum* L. – Gujarat (Sebastian & Sudhikumar, 2002)

*Aphis (Aphis) gossypii* Glover, 1877

*Abelmoschus esculentus* Moench – Chhattisgarh (Chaturvedani *et al.*, 2023)

Unidentified aphid

Unidentified plant – Maharashtra (Patil *et al.*, 2018)

**13. *Zygoballus* sp.**

*Melanaphis nr. arundinariae* (Takahashi, 1937)

*Pyrus pashia* Buch.–Ham. ex D. Don – Uttarakhand (Debnath, 1991)

*Mollitrichosiphum* sp.

*Alnus nepalensis* D. Don – Uttarakhand (Debnath, 1991)

*Myzus (Myzus) dycei* Carver, 1961

*Urtica dioica* L. – Uttarakhand (Debnath, 1991)

*Pemphigus (Pemphigus) mordwilkoii* Cholodkovsky, 1912

*Populus ciliata* Wall. ex Royle – Uttarakhand (Debnath, 1991)

*Sappaphis* sp.

*Cotoneaster bacillaris* Wall. ex Lindl. – Uttarakhand (Debnath, 1991)

**14. Unidentified species**

*Myzus (Nectarosiphon) persicae* (Sulzer, 1776)

*Brassica oleracea* L. *capitata* – West Bengal (Anusha *et al.*, 2022)

**M. Family Tetragnathidae:** Tetragnathidae is commonly called as longed-jawed orb weavers, long-jawed spiders, stretch spiders or stilt spiders. These spiders spin more or less horizontal orb webs which are loosely woven with an open hub with few wide-set radii and spiral with no signal line or retreat. The spider usually sits in the centre of the web. These spiders are often found in vegetation near water. These long-jawed spiders restrain their active prey by grasping it with their legs and inject poison/digestive juices through fangs located at the tips of the chelicerae (Singh, 2021c). At present, 64 species are known from India (Singh *et al.*, 2023a), out of which only 4 species are known to prey on 7 species of aphids infesting 9 species of host plants in 6 states as given below.

**1. *Leucauge celebesiana* (Walckenaer, 1841)**

*Aphis (Aphis) craccivora* Koch, 1854

*Lablab purpureus* (L.) Sweet ssp. *purpureus* – Maharashtra (Kale *et al.*, 2020)

*Aphis (Aphis) gossypii* Glover, 1877

*Galinsoga parviflora* Cav. – West Bengal (Raychaudhuri *et al.*, 1979; Kale *et al.*, 2020)

*Aphis (Aphis) pomi* de Geer, 1773

*Malus domestica* (Suckow) Borkh. – Jammu & Kashmir (Khan, 2016)

*Vicia faba* L. – West Bengal (Debnath, 2020)

*Uroleucon (Uromelan) compositae* (Theobald, 1915)

*Carthamus tinctorius* L. – Maharashtra (Kale *et al.*, 2020)

Unidentified aphid

Unidentified plant – Maharashtra (Patil *et al.*, 2018)

**2. *Leucauge decorata* (Blackwall, 1864)**

*Aphis (Aphis) craccivora* Koch, 1854



- Lablab purpureus* (L.) Sweet ssp. *purpureus* – Maharashtra (Kale *et al.*, 2020)  
*Aphis* (*Aphis*) *gossypii* Glover, 1877  
*Gossypium hirsutum* L. – Tamil Nadu (Vanitha *et al.*, 2009)  
*Uroleucon* (*Uromelan*) *compositae* (Theobald, 1915)  
*Carthamus tinctorius* L. – Maharashtra (Kale *et al.*, 2020)  
**3. *Tetragnatha javana*** (Thorell, 1890) [syn. *Eucta javana* Thorell, 1890]  
*Aphis* (*Aphis*) *gossypii* Glover, 1877  
*Gossypium hirsutum* L. – Tamil Nadu (Kannan *et al.*, 2004)  
*Aphis* (*Aphis*) *spiraecola* Patch, 1914  
*Solanum nigrum* L. – Himachal Pradesh (Das & Raychaudhuri, 1983)  
**4. *Tetragnatha mandibulata*** Walckenaer, 1841  
*Aphis* (*Aphis*) *craccivora* Koch, 1854  
*Vigna unguiculata* (L.) Walp. – Kerala (Manu, 2005)  
*Aphis* (*Aphis*) *gossypii* Glover, 1877  
*Abelmoschus esculentus* Moench – Kerala (Manu, 2005)  
**5. *Tetragnatha* sp.**  
*Rhopalosiphum maidis* (Fitch, 1856)  
*Sorghum bicolor* (L.) Moench – Maharashtra (Kale *et al.*, 2020)  
**6. Unidentified species**  
*Myzus* (*Nectarosiphon*) *persicae* (Sulzer, 1776)  
*Brassica oleracea* L. *capitata* – West Bengal (Anusha *et al.*, 2022)

**N. Family Theridiidae:** These spiders are commonly known as the cobweb spiders, tangle-web spiders, and comb-footed spiders and have a comb of serrated bristles on the tarsus of the fourth leg which is used to throw sticky silk over the prey to wrap them (Singh, 2021d). At present, 126 species of cobweb spiders are known from India (Singh *et al.*, 2023a), but only 4 species were recorded as aphidophagous preying on 18 species of aphids infesting 20 species of plants distributed in only 6 states/union territories as given below.

- 1. *Argyrodes* sp.**  
*Aphis* (*Aphis*) *verbasci* Schrank, 1801  
*Verbascum thapsus* L. – Uttarakhand (Debnath, 1991)  
*Macrosiphoniella* (*Macrosiphoniella*) *sanborni* (Gillette, 1908)  
*Chrysanthemum* sp. – Uttarakhand (Debnath, 1991)  
**2. *Chrysso angula*** (Tikader, 1970) [syn. *Theridula swatie* Biswas, Saha & Raychaudhuri, 1997]  
*Cinara* (*Cupressobium*) *tujafilina* (del Guercio, 1909)  
*Thuja* sp. – West Bengal (Raychaudhuri *et al.*, 1998)  
**3. *Meotipa argyroformis*** (Yaginuma, 1952)  
*Aphis* (*Aphis*) *gossypii* Glover, 1877  
*Solanum melongena* L. – Tamil Nadu (Sankari & Thiyagesan, 2010)  
*Trichosanthes cucumerina* L. – Tamil Nadu (Sankari & Thiyagesan, 2010)  
**4. *Theridion manjithar*** Tikader, 1970  
*Aphis* (*Aphis*) *craccivora* Koch, 1854  
*Gossypium hirsutum* L. – Gujarat (Sebastian & Sudhikumar, 2002)  
*Aphis* (*Aphis*) *pomi* de Geer, 1773  
*Malus domestica* (Suckow) Borkh. – Jammu & Kashmir (Khan, 2016)  
**5. *Theridion* sp.**  
*Aphis* (*Aphis*) *craccivora* Koch, 1854  
Unidentified – West Bengal (Raychaudhuri *et al.*, 1979)

*Aphis (Aphis) gossypii* Glover, 1877  
*Zinnia* sp. – Himachal Pradesh (Agarwala *et al.*, 1981)  
*Brachycaudus (Brachycaudus) helichrysi* (Kaltenbach, 1843)  
*Prunus persica* (L.) Batsch – Uttarakhand (Debnath, 1991)  
*Cinara (Cupressobium) tujafilina* (del Guercio, 1909)  
*Cupressus* sp. – West Bengal (Raychaudhuri *et al.*, 1978)  
*Hayhurstia atriplicis* (Linnaeus, 1761)  
*Chenopodium album* L. – Uttarakhand (Debnath, 1991)  
*Liosomaphis himalayensis* Basu, 1964  
*Berberis aristata* DC. – Uttarakhand (Debnath, 1991)  
*Lipaphis (Lipaphis) erysimi* (Kaltenbach, 1843)  
*Brassica juncea* (L.) Czern. – West Bengal (Ghosh, 1983)  
*Melanaphis* nr. *arundinariae* (Takahashi, 1937)  
*Pyrus pashia* Buch.–Ham. ex D. Don – Uttarakhand (Debnath, 1991)  
*Myzocallis (Globulicaudaphis) pakistanica* (Hille Ris Lambers, 1966)  
*Quercus* sp. – Himachal Pradesh (Das & Raychaudhuri, 1983)  
*Myzus (Myzus) dycei* Carver, 1961  
*Urtica dioica* L. – Uttarakhand (Debnath, 1991)  
*Nippolachnus* sp.  
*Quercus* sp. – Himachal Pradesh (Das & Raychaudhuri, 1983)  
*Pemphigus (Pemphigus) mordwilkoii* Cholodkovsky, 1912  
*Populus ciliata* Wall. ex Royle – Uttarakhand (Debnath, 1991)  
*Prociphilus* sp.  
*Lonicera quinquelocularis* Hardw. – Uttarakhand (Debnath, 1991)  
*Sappaphis* sp.  
*Cotoneaster bacillaris* Wall. ex Lindl. – Uttarakhand (Debnath, 1991)  
*Sitobion (Sitobion) miscanthi* (Takahashi, 1921)  
*Triticum aestivum* L. – Uttarakhand (Debnath, 1991)

**O. Family Thomisidae:** These spiders are commonly known as the crab spiders, flower spiders or flower crab spiders because of their crab-like appearance. Most of the species are found on vegetation. Crab spiders do not build web, rather capture the prey by ambushing and sometimes by active pursuit. They are not active hunters but are sit-and-wait predators that hunt in flowers, foliage, or leaf litter. They remain impassive until the prey arrives and catches it (Singh G & Singh, 2021a). At present, 242 species are known in India (Singh *et al.*, 2023a), but only 12 species are aphidophagous preying on 18 species of aphids infesting 18 plant species distributed only in 6 states as mentioned below.

**1. *Camaricus formosus* Thorell, 1887**

*Lipaphis (Lipaphis) erysimi* (Kaltenbach, 1843)  
*Brassica rapa* L. – West Bengal (Agarwala *et al.*, 1981)  
*Brassica juncea* (L.) Czern. – West Bengal (Ghosh, 1983)

**2. *Henriksenia hilaris* (Thorell, 1877) [syn. *Diaea jaintious* Tikader, 1966]**

*Aphis (Aphis) kurosawai* Takahashi, 1921  
*Artemisia vulgaris* L. – Uttarakhand (Debnath, 1991)

**3. *Indoxysticus minutus* (Tikader, 1960) [syn. *Xysticus minutus* Tikader, 1960]**

*Myzus (Myzus) mumecola* (Matsumura, 1917)  
 Unidentified plant – Himachal Pradesh (Das & Raychaudhuri, 1983)  
*Pterocallis (Pterocallis) affinis* Chakrabarti, 1988  
*Corylus colurna* L. – Uttarakhand (Debnath, 1991)

4. *Misumena* sp.  
*Macrosiphum* (*Macrosiphum*) *rosae* (Linnaeus, 1758)  
*Rosa* sp. – Himachal Pradesh (Das & Raychaudhuri, 1983)  
*Sitobion* (*Sitobion*) *rosaeiformis* (Das, 1918)  
*Rosa* sp. – Himachal Pradesh (Agarwala *et al.*, 1981)
5. *Misumenops khandalaensis* Tikader, 1965  
*Sitobion* (*Sitobion*) *indicum* Basu, 1964  
Unidentified grass – Himachal Pradesh (Das & Raychaudhuri, 1983)
6. *Ozyptila* sp.  
*Myzus* (*Myzus*) *ornatus* (Laing, 1932)  
Unidentified plant – Himachal Pradesh (Das & Raychaudhuri, 1983)
7. *Synema decoratum* Tikader, 1960  
*Aphis* (*Aphis*) *craccivora* Koch, 1854  
*Vigna unguiculata* (L.) Walp. – Madhya Pradesh (Upadhyay *et al.*, 2018b)
8. *Thomisus projectus* Tikader, 1960  
*Lipaphis* (*Lipaphis*) *erysimi* (Kaltenbach, 1843)  
*Brassica oleracea* L. – Maharashtra (Shaikh *et al.*, 2020)  
*Brassica rapa* L. – Maharashtra (Shaikh *et al.*, 2020)  
*Raphanus sativus* L. – Maharashtra (Shaikh *et al.*, 2020)
9. *Thomisus pugilis* Stoliczka, 1869  
*Aphis* (*Aphis*) *craccivora* Koch, 1854  
*Gossypium hirsutum* L. – Gujarat (Sebastian & Sudhikumar, 2002)  
*Lablab purpureus* (L.) Sweet ssp. *purpureus* – West Bengal (Agarwala *et al.*, 1981)  
*Lipaphis* (*Lipaphis*) *erysimi* (Kaltenbach, 1843)  
*Brassica juncea* (L.) Czern. – West Bengal (Ghosh, 1983)
10. *Thomisus spectabilis* Doleschall, 1859  
*Aphis* (*Aphis*) *gossypii* Glover, 1877  
*Gossypium hirsutum* L. – Maharashtra (Nagrare *et al.*, 2015)
11. *Thomisus* sp.  
*Aphis* (*Aphis*) *gossypii* Glover, 1877  
*Abelmoschus esculentus* Moench – Maharashtra (Kale *et al.*, 2020)  
*Lipaphis* (*Lipaphis*) *erysimi* (Kaltenbach, 1843)  
*Brassica rapa* L. – Maharashtra (Kale *et al.*, 2020)  
*Macrosiphum* (*Macrosiphum*) *rosae* (Linnaeus, 1758)  
*Rosa* sp. – West Bengal (Raychaudhuri *et al.*, 1979; Debnath, 2020)
12. *Xysticus bengalensis* Tikader & Biswas, 1974  
*Uroleucon* (*Uroleucon*) *sonchi* (Linnaeus, 1767)  
*Sonchus arvensis* L. – Uttarakhand (Debnath, 1991)
13. *Xysticus croceus* Fox, 1937 (syn. *Xysticus sujatai* Tikader, 1962)  
*Aphis* (*Aphis*) *craccivora* Koch, 1854  
*Gossypium hirsutum* L. – Gujarat (Sebastian & Sudhikumar, 2002)
14. *Xysticus* sp.  
*Capitophorus formosartemisiae* (Takahashi, 1921)  
*Artemisia vulgaris* L. – Uttarakhand (Debnath, 1991)  
*Cavariella* (*Cavariella*) *indica* Maity & Chakrabarti, 1982  
*Salix babylonica* L. – Uttarakhand (Debnath, 1991)  
*Eriosoma lanigerum* (Hausmann, 1802)  
*Malus domestica* (Suckow) Borkh. – Uttarakhand (Debnath, 1991)

*Eutrichosiphum khasyanum* (Ghosh & Raychaudhuri, 1962)  
*Quercus* sp. – Himachal Pradesh (Das & Raychaudhuri, 1983)  
*Liosomaphis himalayensis* Basu, 1964  
*Berberis aristata* DC. – Uttarakhand (Debnath, 1991)  
*Myzus (Myzus) ornatus* (Laing, 1932)  
 Unidentified plant – Himachal Pradesh (Das & Raychaudhuri, 1983)  
*Prociphilus* sp.  
*Pinus wallichiana* A.B. Jacks. – Uttarakhand (Debnath, 1991)  
*Sitobion (Sitobion) miscanthi* (Takahashi, 1921)  
*Triticum aestivum* L. – Uttarakhand (Debnath, 1991)

**P. Family Uloboridae:** The spiders of the family Uloboridae are commonly known as the hackled-band orb-weavers as the spiral portion of the capturing web (in the form of orbs or portions of orbs) is spun by an unusual type of wooly silk thread known as hackled band. These spiders sometimes live in group with individual webs loosely connected. They lack poison glands and encase their prey thoroughly in silk covering it in regurgitated digestive juice, and then ingest the liquified body (Singh G & Singh, 2021b). In India, only 30 species are known, out of which only one species of spider is known to prey on 2 species of aphids infesting 3 species of plants only in West Bengal as mentioned below.

**1. *Uloborus khasiensis*** Tikader, 1969

*Aphis (Aphis) gossypii* Glover, 1877  
*Gossypium hirsutum* L. – Gujarat (Dhulia & Yadav, 1991)

**2. *Uloborus* sp.**

*Aphis (Aphis) gossypii* Glover, 1877  
*Tagetes erecta* L. – West Bengal (Raychaudhuri *et al.*, 1979; Debnath, 2020)  
*Cinara (Cupressobium) tujafilina* (del Guercio, 1909)  
*Cupressus* sp. – West Bengal (Raychaudhuri *et al.*, 1979)

**Q. Unidentified species**

*Aphis (Aphis) craccivora* Koch, 1854  
*Arachis hypogaea* L. – Andhra Pradesh (Kumar *et al.*, 2023)  
*Pisum sativum* L. – Gujarat (Chauhan *et al.*, 2023)  
*Aphis (Aphis) gossypii* Glover, 1877  
*Abelmoschus esculentus* Moench – Tamil Nadu (Shanthi *et al.*, 2020)  
*Gossypium hirsutum* L. – Andhra Pradesh (Rajasekhar & Durga Prasad, 2018); Haryana (Kumar *et al.*, 2016)  
*Myzus (Nectarosiphon) persicae* (Sulzer, 1776)  
*Solanum lycopersicum* L. – Rajasthan (Khokhar & Rolania, 2021)

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