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## Biodiversity of Aphids (Insecta: Homoptera: Aphididae) Infesting Legumes (Angiospermae: Fabales: Fabaceae) in India

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**Abstract:** *The angiospermic family Fabaceae or Leguminosae is the second largest family in the world. Out of about 1200 species described, only 122 species were found to be attacked by one or other aphid (Insecta : Homoptera : Aphididae) species. On record, 73 aphid species colonise the legumes in India, among which Aphis craccivora is the dominating species and feeds on 83 species of legumes followed by Aphis gossypii (39 species) and Acyrthosiphon pisum (20 species). The higher number of aphid species (16 species) are found to colonise Cajanus cajan followed by Lablab purpureus ssp. purpureus (12 aphid species) and Vigna unguiculata ssp. cylindrica (8 aphid species).*

**Keywords:** Legume, *Aphis craccivora*, *Cajanus cajan*, host-plant record, aphids.

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### 1. INTRODUCTION

About 4,700 species of aphids (Insecta : Homoptera : Aphididae), popularly known as plant-lice or ant-cows, constitute a group of small sized (0.7 to 7.0 mm in length) insects that suck the phloem fluid of plants [1] and about 1000 species are injurious to crops throughout the world [2]. Thelytokous parthenogenetic viviparity (obligate parthenogenesis where mothers give birth only to daughter young ones), short generation time (about 10 days on average), telescoping of generations (where granddaughters begin developing directly within the daughters which are themselves not yet born) and polymorphism are major traits of aphids that make them highly prolific in reproduction [3]. Many species of aphids display complex life cycles with alternation of sexual and asexual generations and host plant alternation [4]. The aphids excrete characteristic sugary substance, honeydew, which attracts wasps, butterflies, some moths and famously, some species of ants [5]. Aphids are also abused as they transmit viral diseases to several crops that warrant crop management strategies. Although aphids are the pest of crops, they are extremely important hosts for a number of parasitoids, predators and an essential meal for numerous other insects, as well as birds [5].

The legume or bean family Fabaceae or Leguminosae have a remarkable ecological and economical importance. It includes trees, shrubs and perennial or annual herbaceous plants, which are easily recognized by their fruit (legume) and their compound, stipulated leaves. The group is widely distributed and is the third-largest land plant family in terms of number of species (over 24,500 species) [6]. A number of legume crops are important food plants (e.g., *Glycine max* (soybean), *Phaseolus* (beans), *Pisum sativum* (pea), *Cicer arietinum* (chickpeas); forage crops (e.g., *Medicago sativa* (alfalfa), *Arachis hypogaea* (peanut) and *Lathyrus odoratus* (sweet pea); industrial legumes (e.g., *Indigofera* cultivated for indigo, *Acacia* for gum arabic and *Derris* for the insecticide); green manure legumes (e.g., *Leucaena*, *Cyamopsis* and *Sesbania*); timber crops (e.g., *Acacia* species, *Dalbergia* species and *Castanospermum austral*). In addition, a number of species are also weedy pests in different parts of the world. The plants of this group also possess symbiotic rhizobial bacteria in nodules, mainly located in the root cortex of the plant and help in fixing atmospheric nitrogen making soil more fertile [7].

Earlier, the Indian aphids and their host plants were catalogued in 1983 [8] and additions were made in 2001 [9] and later on by several authors but most of the names of aphid species as well as plant species mentioned therein are either invalid or misnomer. Following article deals with the updated checklist of aphids and its host plants belonging to the family Fabaceae based on the records in literatures and surveys

upto July 2015. In the present compilation, attempts have been made to provide the valid scientific name of the plants following update taxonomic informations provided by <http://aphid.speciesfile.org> for aphids and <http://www.ars-grin.gov> and <http://www.theplantlist.org> for plants. At several places, their synonymies were also mentioned. The subgeneric names of the aphids were excluded.

Following is the updated checklist of aphids infesting the plants belonging to the Fabaceae (or Leguminosae).

## 2. PLANT – APHID CHECK LIST

1. *Abrus* sp. : *Aphis craccivora* Koch [10]
2. *Acacia catechu* (L.f.) Willd. : *Aphis acaciae* Sathe and Jadhav [11]
3. *Acacia* sp. : *Aphis gossypii* Glover [12]
4. *Aeschynomene americana* Linn. : *Aphis craccivora* Koch [13]
5. *Aeschynomene* sp. : *Aphis craccivora* Koch [14]
6. *Albizia odoratissima* (Koroi) : *Toxoptera aurantii* (Boyer de Fonsc.) [15,16,17]
7. *Alhagi camelorum* Fisch. : *Acyrtosiphon pisum* (Harris) [16,18], *Aphis craccivora* Koch [16]
8. *Alhagi pseudoalhagi* (M. Bieb) Desv. : *Aphis craccivora* Koch [19]
9. *Alysicarpus glumaceus* (Vahl.) DC.: *Aphis craccivora* Koch [19]
10. *Alysicarpus rugosus* (Wild.) DC. : *Aphis craccivora* Koch [16,20]
11. *Arachis hypogaea* L.: *Aphis craccivora* Koch [16,20-26], *Aphis nasturtii* Kaltentbach [17]
12. *Astragalus* sp. : *Aphis astragali* Ossiannilsson [27]
13. *Bauhinia acuminata* L. : *Aphis spiraecola* Patch [28]
14. *Bauhinia variegata* L. : *Aphis gossypii* Glover [29]
15. *Bauhinia* sp.: *Aphis spiraecola* Patch [30], *Cervaphis apatii* Jadhav and Sathe [31]
16. *Butea minor* Ham. : *Brachycaudus helichrysi* (Kaltentbach) [32]
17. *Butea monosperma* (Lam.) Taub. (= *Butea frondosa* Roxb. ex Willd.) : *Aphis gossypii* Glover [16,19]
18. *Caesalpinia coriaria* (Jacq.) Willd. : *Toxoptera aurantii* (Boyer de Fonsc.) [16]
19. *Caesalpinia decapetala* (Roth) Alston (= *Caesalpinia sepiaria* Roxb.) : *Aphis gossypii* Glover [9], *Sitobion aulacorthoides* (David, Rajasingh and Narayanan) [12]
20. *Caesalpinia* sp. : *Sitobion aulacorthoides* (David et al.) [28]
21. *Cajanus cajan* (L.) Millsp. (= *Cajanus indicus* Spreng.) : *Acyrtosiphon* ? *caraganae* (Cholodk-ovsky) [28,33], *Acyrtosiphon pisum* (Harris) [34], *Aphis craccivora* Koch [16,21,35], *Aphis fabae* Scopoli [36], *Aphis gossypii* Glover [28], *Aphis spiraecola* Patch [32,37], *Brachycaudus cardui* (Linnaeus) [38], *Brachycaudus helichrysi* (Kaltentbach) [38], *Brevicoryne brassicae* (Linnaeus) [38], *Cervaphis rappardi indica* Basu [32,39-41], *Cervaphis schouteniae* van der Goot [16,42,43], *Megoura lespedezae* (Essig and Kuwana) [28,32,40], *Myzus persicae* (Sulzer) [28,44], *Rhopalosiphum kolhapurensis* Sathe and Jadhav [45], *Rhopalosiphum maidis* (Fitch) [46], *Cervaphis rappardi rappardi* Hille Ris Lambers [47]
22. *Cajanus* sp. : *Aphis craccivora* Koch [48]
23. *Calliandra haematocephala* Hassk. : *Aphis gossypii* Glover [28]
24. *Calliandra* sp. : *Aphis gossypii* Glover [49,50]
25. *Canavalia ensiformis* (L.) DC. : *Aphis craccivora* Koch [32]
26. *Cassia fistula* L. : *Aphis craccivora* Koch [36,51], *Aphis fabae* Scopoli [52], *Myzus persicae* (Sulzer) [28], *Toxoptera odinae* (van der Goot) [28,53]

27. *Cassia javanica* L. : *Aphis craccivora* Koch [32,40]
28. *Cassia* sp. : *Aphis craccivora* Koch [21,48], *Aphis gossypii* Glover [28,43], *Greenidea longicornis* Ghosh, Ghosh and Raychaudhuri [47], *Myzus persicae* (Sulzer) [54], *Toxoptera citricida* (Kirkaldy) [53], *Toxoptera odinae* (van der Goot) [28,53]
29. *Castanospermum* sp. : *Mollitrichosiphum tenuicorpus* (Okajima) [16,33,55], *Betacallis querciphaga* Basu, Ghosh and Raychaudhuri [33,55,56]
30. *Chamaecrista absus* (L.) Irwin and Barneby (= *Cassia absus* L.) : *Toxoptera citricida* (Kirkaldy) [53]
31. *Cicer arietinum* L. : *Acyrtosiphon pisum* (Harris) [23,25], *Aphis craccivora* Koch [16,21,23,28, 48], *Aphis gossypii* Glover [35]
32. *Cicer* sp. : *Aphis craccivora* Koch [57]
33. *Clitoria ternatea* L. : *Aphis gossypii* Glover [42,58]
34. *Crotalaria alata* Buch.-Ham. ex Roxb. : *Aphis gossypii* Glover [23]
35. *Crotalaria juncea* L. : *Aphis craccivora* Koch [16,20,32], *Aphis gossypii* Glover [16,43], *Aphis umbrella* (Borner) [16], *Aulacorthum magnoliae* (Essig and Kuwana) [33]
36. *Crotalaria pallida* Aiton (= *Crotalaria brownie* Bertero ex DC., = *Crotalaria mucronata* Desv. : *Aphis craccivora* Koch [13,34], *Aphis gossypii* Glover [13], *Aphis spiraeicola* Patch [28], *Brachycaudus helichrysi* (Kalt.) [28], *Aphis fabae* complex [32], *Schizaphis rotundiventris* (Signoret) [32]
37. *Crotalaria* sp. : *Aphis craccivora* Koch [28,54], *Aphis gossypii* Glover [23,54], *Aphis nasturtii* Kaltenbach [17,28], *Aphis spiraeicola* Patch [54], *Myzus persicae* (Sulzer) [44,50]
38. *Cyamopsis tetragonoloba* (L.) Taub. : *Aphis craccivora* Koch [16,20,24], *Aphis gossypii* Glover [23]
39. *Dalbergia sissoo* Roxb. ex DC. : *Aphis craccivora* Koch [50,59,60], *Cinara similis* (van der Goot) [12], *Greenidea* sp. [16], *Myzus persicae* (Sulzer) [16], *Toxoptera aurantii* (Boyer de Fonsc.) [61]
40. *Dalbergia* sp. : *Aphis craccivora* Koch [28]
41. *Delonix regia* (Bojer ex Hook) Raf. : *Macrosiphoniella sanborni* (Gillette) [36]
42. *Desmodium caudatum* (Thunb.) DC. (= *Desmodium laburnifolium* (Poir.) DC.) : *Aphis gossypii* Glover [9]
43. *Desmodium* sp. : *Acyrtosiphon rubi* (Narzikulov) [62], *Aphis craccivora* Koch [28], *Capitophorus mitegoni* Eastop [28], *Megoura lespedezae* (Essig and Kuwana) [63,64], *Sitobion rosaeiformis* (Das) [28]
44. *Desmodium trifolium* (L.) DC. : *Megoura lespedezae* (Essig and Kuwana) [28,33]
45. *Dolichos* sp. : *Aphis craccivora* Koch [65]
46. *Erythrina indica* Lam. : *Toxoptera odinae* (van der Goot) [28,53]
47. *Flemingia macrophylla* (Willd.) Merr. (= *Moghania macrophylla* (Willd.) Kuntz.) : *Aphis craccivora* Koch [66], *Aphis gossypii* Glover [66]
48. *Gliricidia maculata* (Kunth) Kunth ex Walp. : *Aphis craccivora* Koch [16,20,24], *Indomyzus glaricae* Sathe and Jadhav [45]
49. *Glycine max* (L.) Merrill. (= *Glaxina maxima* auct. nonn.) : *Aphis glycines* Matsumura [19,28,32,33], *Acyrtosiphon pisum* (Harris) [22], *Aphis craccivora* Koch [25,42,50,60], *Aphis gossypii* Glover [28], *Aphis* sp. [42], *Myzocallis* sp. [55], *Myzus dycei* Carver [28,33,55], *Myzus persicae* (Sulzer) [67]
50. *Glycine wightii* (Wight and Arn.) Verdc. : *Aphis glycines* Matsumura [34]

51. *Indigofera dosua* Buch.-Ham. ex D. Don : *Megoura dooarsis* (Ghosh and Raychaudhuri) [33]
52. *Indigofera Dregeana* F. Mey (= *Indigofera gerardiana* Wall. Ex Baker) : *Cavariella himachali* Ghosh [68], *Megoura* sp. [25,69]
53. *Indigofera heterantha* Wall. ex Brandis : *Megoura dooarsis* (Ghosh and Raychaudhuri) [70]
54. *Indigofera linnaei* Ali (= *Indigofera enneaphylla* L.) : *Aphis craccivora* Koch [16,20]
55. *Indigofera nigrescens* Kurz ex King and Prain (= *Indigofera nigra* Kurz) : *Aphis craccivora* Koch [16,20]
56. *Indigofera oblongifolia* Forssk. : *Aphis craccivora* Koch [16,71]
57. *Indigofera purpurea* Steud. : *Aphis craccivora* Koch [19]
58. *Indigofera tinctoria* L. : *Aphis craccivora* Koch [16]
59. *Indigofera trita* L.f. (= *Tephrosia trita* misident.) : *Aphis craccivora* Koch [16,20]
60. *Indigofera zollingeriana* Miq. (= *Indigofera teysmannii* Miq.) : *Megoura dooarsis* (Ghosh and Raychaudhuri) [28,33]
61. *Indigofera* sp. : *Anomalosiphum indigoferae* Ghosh, Ghosh and Raychaudhuri [28, 33,73,72], *Aphis craccivora* Koch [20,28,54,57], *Aphis gossypii* Glover [28], *Aulacorthum circumflexum* (Buckton) [54], *Megoura dooarsis* (Ghosh and Raychaudhuri) [28,39], *Nudisiphon folisacculata* (Kumar and Burkhardt) [74], *Toxoptera aurantii* (Boyer de Fonsc.) [17,28,54]
62. *Lablab purpureus* (L.) Sweet ssp. *purpureus* (= *Dolichos lablab* L.) : *Acyrtosiphon ? caraganae* (Cholodkovsky) [28,73], *Acyrtho-siphon pisum* (Harris) [16,18], *Aphis acacae* Sathe and Jadhav [45], *Aphis craccivora* Koch [16,20-24,26,28,48,57,59], *Aphis fabae* complex [75,76], *Aphis gossypii* Glover [16,21], *Aphis rumicis* Linnaeus [32,77], *Aulacorthum circum-flexum* (Buckton) [28], *Brachycaudus helichrysi* (Kalt.) [78], *Myzus ornatus* Laing [28], *Myzus persicae* (Sulzer) [28], *Rhopalosiphum rufi-abdominalis* (Sasaki) [28,79]
63. *Lablab speciosa* ? : *Aphis craccivora* Koch [12]
64. *Lathyrus aphaca* L. : *Aphis craccivora* Koch [35]
65. *Lathyrus odoratus* L. : *Acyrtosiphon pisum* (Harris) [16,18,80,81], *Aphis gossypii* Glover [49,50], *Macrosiphum* sp. [16]
66. *Lathyrus sativus* L. : *Acyrtosiphon pisum* (Harris) [23,32], *Aphis craccivora* Koch [16,21, 50,60]
67. *Lens culinaris* Medik. : *Acyrtosiphon pisum* (Harris) [36], *Aphis craccivora* Koch [35,36,50,60]
68. *Lens culinaris* ssp. *culinaris* Medik (= *Lens esculenta* Moench.) : *Acyrtosiphon pisum* (Harris) [32], *Aphis craccivora* Koch [16,82,83], *Aphis gossypii* Glover [82]
69. *Lespedeza* sp. : *Aphis* sp. [84]
70. *Leucaena glauca* (Willd.) Benth. : *Aphis gossypii* Glover [38]
71. *Leucaena leucocephala* (Lam.) de Wit. (= *Leucaena glauca* auct.) : *Aphis craccivora* Koch [45], *Aphis gossypii* Glover [45], *Brachycaudus helichrysi* (Kalt.) [38]
72. *Lupinus* sp. : *Myzus persicae* (Sulzer) [42]
73. *Medicago lupulina* L. : *Acyrtosiphon pisum* (Harris) [16,18,83], *Aphis craccivora* Koch [16,83], *Myzus persicae* (Sulzer) [42], *Therioaphis ononidis* (Kalt.) [83], *Therioaphis trifolii* (Monell) [16]
74. *Medicago polymorpha* var. *vulgaris* (Benth.) Shinnars (= *Medicago denticulata* Willd.) : *Acyrtosiphon pisum* (Harris) [16,18,83], *Aphis craccivora* Koch [16,83]
75. *Medicago sativa* L. : *Acyrtosiphon kondoi* Shinji [85], *Acyrtosiphon pisum* (Harris) [16,18,23,83], *Acyrtosiphon* sp. [84], *Aphis craccivora* Koch [16,20,24,57,82,83], *Aphis gossypii* Glover [16, 20,49,50], *Therioaphis ononidis* (Kaltenbach) [83,86,87], *Therioaphis trifolii* (Monell) [16,20, 25,38]

76. *Medicago sativa* ssp. *falcate* (L.) Arcang. (= *Medicago falcata* L.) : *Acyrtosiphon pisum* (Harris) [16]
77. *Melilotus albus* Medik : *Acyrtosiphon pisum* (Harris) [16,18], *Aphis craccivora* Koch [35]
78. *Melilotus indicus* (L.) All. : *Aphis craccivora* Koch [23], *Aphis gossypii* Glover [82]
79. *Melilotus indicus* (L.) var. *indicus* (= *Melilotus parviflorus* Dest.) : *Aphis craccivora* Koch [16]
80. *Mimosa pudica* L. : *Aphis craccivora* Koch [28,33,50,60], *Aphis gossypii* Glover [28], *Sitobion mimosae* (Ghosh et al.) [20,33], *Sitobion takahashii* (Eastop) [33,88,89]
81. *Mimosa* sp. : *Anomalosiphum indigoferae* Ghosh et al. [38], *Aphis craccivora* Koch [30]
82. *Mucuna* sp. : *Aphis craccivora* Koch [90]
83. *Parkia timoriana* (DC.) Merr. (= *Parkia roxberghii* G. Don) : *Toxoptera odinae* (van der Goot) [32]
84. *Peltophorum pterocarpum* (DC.) Backer ex K. Heyne : *Aphis gossypii* Glover [19], *Aphis gossypii* Glover [28], *Tinocallis himalayensis* Ghosh et al. [33,91]
85. *Phaseolus sinensis* Hort. ex Schur : *Aphis craccivora* Koch [35,36]
86. *Phaseolus* sp. : *Acyrtosiphon phaseoli* Chakrabarti et al. [25,69,92], *Aphis craccivora* Koch [69], *Aphis* sp. [93]
87. *Phaseolus vulgaris* Linn. : *Aphis gossypii* Glover [94], *Aphis craccivora* Koch [32], *Hyalopterus pruni* (Geoffroy) [16,43], *Myzus persicae* (Sulzer) [16,43], *Smynthuodes betae* Westwood [42]
88. *Pisum sativum* Linn. : *Acyrtosiphon pisum* (Harris) [16,18,21-23,25,32,33,71,87], *Aphis craccivora* Koch [24,26,28,32,35,42,48,59], *Aphis spiraecola* Patch [28,40], *Macrosiphum centranthi* Theobald [88], *Myzus persicae* (Sulzer) [16,28,44], *Sitobion rosaeiformis* (Das) [28], *Tetraneura nigriabdominalis* (Sasaki) [55], *Acyrtosiphon vatanii* Sathe and Jadhav [45]
89. *Pisum* sp. : *Acyrtosiphon pisum* (Harris) [28,33]
90. *Prosopis juliflora* (Sw.) DC. : *Aphis gossypii* Glover [16,71]
91. *Psophocarpus tetragonolobus* (L.) DC. : *Aphis craccivora* Koch [42]
92. *Robinia pseudoacacia* L. : *Aphis craccivora* Koch [84,95,96]
93. *Samanea saman* (Jacq.) Merr. (= *Pithecellobium saman* Jacq.) : *Toxoptera citricida* (Kirkaldy) [30]
94. *Senna alata* (L.) Roxb. (= *Cassia alata* L.) : *Aphis craccivora* Koch [96]
95. *Senna auriculata* (L.) Roxb. (= *Cassia auriculata* L.) : *Aphis craccivora* Koch [16,24]
96. *Senna hirsuta* (L.) H. S. Irwin and Barneby var. *hirsuta* (= *Cassia hirsuta* L.) : *Aphis craccivora* Koch [32], *Aphis gossypii* Glover [32]
97. *Senna siamea* (Lam.) H.S. Irwin and Barneby (= *Cassia siamea* Lam.) : *Toxoptera odinae* (van der Goot) [40,41]
98. *Senna sophera* (L.) Roxb. (= *Cassia sophera* L.) : *Aphis craccivora* Koch [23,28,32,96], *Aphis gossypii* Glover [28,38], *Myzus persicae* (Sulzer) [28]
99. *Senna tora* (L.) Roxb. (= *Cassia tora* L.) : *Aphis craccivora* Koch [24,97,98]
100. *Sesbania bispinosa* (Jacq.) W. Wight : *Aphis craccivora* Koch [16,98]
101. *Sesbania cannabina* (Retz.) Pers. : *Aphis craccivora* Koch [16]
102. *Sesbania grandiflora* (L.) Pers. : *Acyrtosiphon gossypii* Mordvilko [16,99], *Acyrtosiphon pisum* (Harris) [16,100], *Aphis craccivora* Koch [16,20,57,100], *Aphis gossypii* Glover [28]
103. *Sesbania speciosa* Taub. : *Aphis craccivora* Koch [16,20,98]

104. *Smithia sensitiva* Aiton : *Aphis craccivora* Koch [32]
105. *Sophora tomentosa* L. : *Acyrtosiphon gossypii* Mordvilko [101]
106. *Tamarindus indica* L. : *Aphis gossypii* Glover [80], *Myzus persicae* (Sulzer) [45], *Toxoptera aurantii* (Boyer de Fonsc.) [16,71]
107. *Tamarindus* sp. : *Toxoptera aurantii* (Boyer de Fonsc.) [30]
108. *Tephrosia candida* DC. : *Aphis craccivora* Koch [28,38]
109. *Tephrosia purpurea* (L.) Pers. : *Aphis craccivora* Koch [16,20], *Megoura dooarsis* (Ghosh and Raychaudhuri) [22,102,103]
110. *Tephrosia* sp. : *Brachycaudus helichrysi* (Kaltenbach) [9], *Longicaudus himalayensis* Hille Ris Lambers [9,103]
111. *Trifolium alexandrinum* Linn. (= *Trifolium alexandrum* auct. nonn.) : *Acyrtosiphon pisum* (Harris) [23], *Aphis craccivora* Koch [16,20,83], *Hyadaphis coriandri* (Das) [36], *Therioaphis trifolii* (Monell) [36], *Lipaphis erysimi* (Kaltenbach) [104]
112. *Trifolium praetutianum* Guss. (= *Trifolium prulentianum* auct. nonn.) : *Aphis craccivora* Koch [22], *Myzus persicae* (Sulzer) [22]
113. *Trifolium repens* L. : *Aphis craccivora* Koch [42,105]
114. *Trifolium* sp. : *Myzus persicae* (Sulzer) [23], *Therioaphis trifolii* (Monell) [106]
115. *Trigonella foenum-graecum* L. : *Acyrtosiphon pisum* (Harris) [16,23], *Aphis craccivora* Koch [16,35,82], *Aphis gossypii* Glover [49,50,82], *Myzus persicae* (Sulzer) [82]
116. *Trigonella polycerata* L. : *Aphis craccivora* Koch [107]
117. *Uraria* sp. : *Greenideoida bhalukpongensis* Ghosh et al. [33,73]
118. *Vicia faba* L. : *Acyrtosiphon pisum* (Harris) [23,28,33,108], *Aphis craccivora* Koch [16,28,32, 35,40], *Aphis fabae* complex [19,28,32,33,76], *Aphis gossypii* Glover [28,49,50], *Aphis spiraecola* Patch [28,32,50], *Chaetogeioica graminiphaga* Raychaudhuri et al. [55], *Myzus ornatus* Laing [28], *Myzus persicae* (Sulzer) [28,44]
119. *Vicia sativa* L. : *Aphis craccivora* Koch [104], *Aphis gossypii* Glover [104], *Myzus persicae* (Sulzer) [29]
120. *Vigna mungo* (L.) Hepper (= *Phaseolus roxburghii* Wight and Arn.) : *Aphis craccivora* Koch [32,38]
121. *Vigna mungo* (L.) Hepper var. *mungo* (= *Phaseolus mungo* L.) : *Aphis craccivora* Koch [16,20,21,23,28,32,32,50,83,98]
122. *Vigna radiata* (L.) R. Wiczek var. *radiata* (= *Phaseolus radiatus* L.; *Phaseolus aureus* Roxb.) : *Aphis craccivora* Koch [16,20,35,82,98], *Smynthuodes betae* Westwood [79]
123. *Vigna sativa* (Fabr.) : *Aphis craccivora* Koch [35]
124. *Vigna* sp. : *Anomalosiphum indigoferae* Ghosh et al. [32], *Aphis craccivora* Koch [35]
125. *Vigna trilobata* (L.) Verdc. (= *Phaseolus trilobus* sensu auct.) : *Aphis craccivora* Koch [16,20]
126. *Vigna unguiculata* (L.) Walp. ssp. *cylindrica* (L.) Verdc. (= *Vigna catjang* (Burm.f.) Walp.; = *Dolichos biflorus* L.) : *Aphis acaciae* Sathe and Jadhav [45], *Aphis craccivora* Koch [16,20,21, 23-26,28,38,59,83,86,98], *Aphis fabae* complex [16,28], *Aphis gossypii* Glover [16], *Aphis rumicis* Linnaeus [38], *Aphis spiraecola* Patch [28], *Brachycaudus helichrysi* (Kaltenbach) [28], *Myzus ornatus* Laing [28]
127. *Vigna unguiculata* ssp. *sensquipedalis* (L.) Walp. (= *Vigna sensquipedalis* (L.) Fruwirth) : *Aphis craccivora* Koch [23]
128. *Vigna unguiculata* ssp. *unguiculata* (L.) Walp. (= *Vigna sinensis* (L.) Savi ex Hassk.) : *Aphis craccivora* Koch [12,50,60], *Sinomegoura citricola* (van der Goot) [109]

129. Unidentified plants : *Anomalosiphum indigoferae* Ghosh, Ghosh and Raychaudhuri [33,72], *Aphis craccivora* Koch [14,110,111,112], *Aphis gossypii* Glover [113], *Acyrtosiphon malvae* (Mosley) [112], *Greenidea decaspermi* Takahashi [33], *Lipaphis erysimi* (Kaltenbach) [25], *Macrosiphum* sp. [16], *Megoura dooarsis* (Ghosh and Raychaudhuri) [25,33,69], *Megoura lespedezae* (Essig and Kuwana) [69,112], *Megoura? lespedezae* (Essig and Kuwana) [112], *Pentalonia nigronervosa* Coquerel [42,113], *Rhopalosiphum nymphaeae* (Linnaeus) [16,42,113], *Tinocallis distinctus* Ghosh et al. [114,115], *Tinocallis himalayensis* Ghosh et al. [71,116]

### **3. APHID-PLANT CHECK LIST**

1. *Acyrtosiphon ? caraganae* : *C. cajan*, *L. purpureus*
2. *Acyrtosiphon gossypii* : *L. purpureus*, *S. grandiflora*,
3. *Acyrtosiphon kondoi* : *M. sativa*
4. *Acyrtosiphon phaseoli* : *Phaseolus* sp.
5. *Acyrtosiphon pisum* : *A. camelorum*, *C. arietinum*, *C. cajan*, *G. max*, *L. culinaris*, *L. culinaris* ssp. *culinaris*, *L. odoratus*, *L. purpureus*, *L. sativus*, *M. albus*, *M. lupulina*, *M. polymorpha* var. *vulgaris*, *M. sativa*, *M. sativa* ssp. *falcata*, *P. sativum*, *Pisum* sp., *S. grandiflora*, *T. alexandrinum*, *T. foenum-graecum*, *V. faba*
6. *Acyrtosiphon rubi* : *Desmodium* sp.
7. *Acyrtosiphon* sp. : *M. sativa*
8. *Acyrtosiphon vatarii* : *P. sativum*
9. *Anomalosiphum indigoferae* : *Vigna* sp., *Mimosa* sp., *Indigofera* sp.
10. *Aphis acaciae* : *A. catechu*, *V. unguiculata*, *L. purpureus*
11. *Aphis astragali* : *Astragalus* sp.
12. *Aphis craccivora* : *A. Americana*, *A. camelorum*, *A. glumaceus*, *A. hypogaea*, *A. pseudoalhagi*, *A. rugosus*, *Abrus* sp., *Aeschynomene* sp., *C. arietinum*, *C. cajan*, *C. ensiformis*, *C. fistula*, *C. javanica*, *C. juncea*, *C. pallida*, *C. tetragonoloba*, *Cajanus* sp., *Cassia* sp., *Cicer* sp., *Crotalaria* sp., *D. sissoo*, *Dalbergia* sp., *Desmodium* sp., *Dolichos* sp., *F. macrophylla*, *G. maculata*, *G. max*, *I. linnaei*, *I. nigrescens*, *I. oblongifolia*, *I. purpurea*, *I. tinctoria*, *I. trita*, *Indigofera* sp., *L. aphaca*, *L. culinaris*, *L. culinaris* ssp. *culinaris*, *L. leucocephala*, *L. purpureus*, *L. sativus*, *L. speciosa* ?, *M. albus*, *M. indicus*, *M. indicus*, *M. lupulina*, *M. polymorpha* var. *vulgaris*, *M. pudica*, *M. sativa*, *Mimosa* sp., *Mucuna* sp., *P. sativum*, *P. sinensis*, *P. tetragonolobus*, *P. vulgaris*, *Phaseolus* sp., *R. pseudoacacia*, *S. alata*, *S. auriculata*, *S. bispinosa*, *S. cannabina*, *S. grandiflora*, *S. hirsuta*, *S. sensitiva*, *S. sophera*, *S. speciosa*, *S. tora*, *T. alexandrinum*, *T. candida*, *T. foenum-graecum*, *T. polycerata*, *T. praetutianum*, *T. purpurea*, *T. repens*, *V. faba*, *V. mungo*, *V. mungo* var. *mungo*, *V. radiata* var. *radiata*, *V. sativa*, *V. sativa*, *V. trilobata*, *V. unguiculata*, *V. unguiculata* ssp. *sensquipedalis*, *V. unguiculata* ssp. *unguiculata*, *Vigna* sp.
13. *Aphis fabae* : *C. cajan*, *C. fistula*, *C. pallida*, *L. purpureus*, *V. faba*, *V. unguiculata*
14. *Aphis glycines* : *G. max*
15. *Aphis glycines* : *G. wightii*
16. *Aphis gossypii* : *Acacia* sp., *B. monosperma*, *B. variegata*, *C. alata*, *C. arietinum*, *C. cajan*, *C. decapetala*, *C. haematocephala*, *C. juncea*, *C. pallida*, *C. ternatea*, *C. tetragonoloba*, *Calliandra* sp., *Cassia* sp., *Crotalaria* sp., *D. caudatum*, *F. macrophylla*, *G. max*, *Indigofera* sp., *L. culinaris* ssp. *culinaris*, *L. glauca*, *L. leucocephala*, *L. odoratus*, *L. purpureus*, *M. indicus*, *M. pudica*, *M. sativa*, *P. juliflora*, *P. pterocarpum*, *P. pterocarpum*, *P. vulgaris*, *S. grandiflora*, *S. hirsute*, *S. sophera*, *T. foenum-graecum*, *T. indica*, *V. faba*, *V. sativa*, *V. unguiculata*
17. *Aphis nasturtii* : *A. hypogaea*, *Crotalaria* sp.
18. *Aphis rumicis* : *L. purpureus*, *V. unguiculata*

19. *Aphis spiraecola* : *B. acuminata*, *Bauhinia* sp., *C. cajan*, *C. pallida*, *Crotalaria* sp., *P. sativum*, *V. faba*, *V. unguiculata*
20. *Aphis umbrella* : *C. juncea*
21. *Aphis* sp. : *G. max*, *Lespedeza* sp., *Phaseolus* sp.
22. *Aulacorthum circumflexum* : *Indigofera* sp., *L. purpureus*
23. *Aulacorthum magnolia* : *C. juncea*
24. *Betacallis querciphaga* : *Castanospermum* sp.
25. *Brachycaudus cardui* : *C. cajan*
26. *Brachycaudus helichrysi* : *B. minor*, *C. cajan*, *C. pallida*, *L. leucocephala*, *L. purpureus*, *Tephrosia* sp., *V. unguiculata*,
27. *Brevicoryne brassicae* : *C. cajan*
28. *Capitophorus mitegoni* : *Desmodium* sp.
29. *Cavariella himachali* : *I. dregeana*
30. *Cervaphis apatii* : *Bauhinia* sp.
31. *Cervaphis rappardi indica* : *C. cajan*
32. *Cervaphis rappardi rappardi* : *C. cajan*
33. *Cervaphis schouteniae* : *C. cajan*
34. *Chaetogeioica graminiphaga* : *V. faba*
35. *Cinara similis* : *D. sissoo*
36. *Greenidea longicornis* : *Cassia* sp.
37. *Greenidea* sp. : *D. sissoo*
38. *Greenideoida bhalukpongensis* : *Uraria* sp.
39. *Hyadaphis coriandri* : *T. alexandrinum*
40. *Hyalopterus pruni* : *P. vulgaris*
41. *Indomyzus glaricae* : *G. maculata*
42. *Lipaphis erysimi* : *T. alexandrinum*
43. *Longicaudus himalayensis* : *Tephrosia* sp.
44. *Macrosiphoniella sanborni* : *D. regia*
45. *Macrosiphum centranthi* : *P. sativum*
46. *Macrosiphum* sp. : *L. odoratus*
47. *Megoura dooarsis* : *I. dosua*, *I. heterantha*, *I. zollingeriana*, *Indigofera* sp., *T. purpurea*
48. *Megoura lespedezae* : *Desmodium* sp., *D. trifolium*, *C. cajan*
49. *Megoura* sp. : *I. dregeana*
50. *Mollitrichosiphum tenuicorpus* : *Castanospermum* sp.
51. *Myzocallis* sp. : *G. max*
52. *Myzus dycei* : *G. max*
53. *Myzus ornatus* : *L. purpureus*, *V. faba*, *V. unguiculata*
54. *Myzus persicae* : *C. cajan*, *C. fistula*, *Cassia* sp., *Crotalaria* sp., *D. sissoo*, *G. max*, *L. purpureus*, *Lupinus* sp., *M. lupulina*, *P. sativum*, *P. vulgaris*, *S. sophera*, *T. foenum-graecum*, *T. indica*, *T. praetutianum*, *Trifolium* sp., *V. faba*, *V. sativa*
55. *Nudisiphon folisacculata* : *Indigofera* sp.



56. *Rhopalosiphum kolhapurensis* : *C. cajan*
57. *Rhopalosiphum maidis* : *C. cajan*
58. *Rhopalosiphum rufiabdominalis* : *L. purpureus*
59. *Schizaphis rotundiventris* : *C. pallida*
60. *Sinomegoura citricola* : *V. unguiculata* ssp. *unguiculata*
61. *Sitobion aulacorthoides* : *C. decapetala*, *Caesalpinia* sp.
62. *Sitobion mimosa* : *M. pudica*
63. *Sitobion rosaeiformis* : *Desmodium* sp., *P. sativum*
64. *Sitobion takahashii* : *M. pudica*
65. *Smynthuroides betae* : *P. vulgaris*, *V. radiata* var. *radiata*
66. *Tetraneura nigriabdominalis* : *P. sativum*
67. *Therioaphis ononidis* : *M. lupulina*, *M. sativa*
68. *Therioaphis trifolii* : *M. lupulina*, *M. sativa*, *T. alexandrinum*, *Trifolium* sp.
69. *Tinocallis himalayensis* : *P. pterocarpum*
70. *Toxoptera aurantii* : *A. odoratissima*, *C. coriaria*, *D. sissoo*, *Indigofera* sp., *T. indica*, *Tamarindus* sp.
71. *Toxoptera citricida* : *C. absus*, *Cassia* sp., *S. saman*
72. *Toxoptera odinae* : *C. fistula*, *Cassia* sp., *E. indica*, *P. timoriana*, *S siamea*

#### **4. CONCLUSION**

The above information revealed that out of estimated Indian aphid fauna of about 653 species [117] only 73 species infest 122 species of legumes out of over 1150 species described [118] in India. *Aphis craccivora* is the dominating species and feeds on 83 species of legumes followed by *Aphis gossypii* (39 species) and *Acyrtosiphon pisum* (20 species). The higher number of aphid species (16 species) are found to colonise *Cajanus cajan* followed by *Lablab purpureus* ssp. *purpureus* (12 aphid species) and *Vigna unguiculata* ssp. *cylindrica* (8 aphid species).

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#### **REFERENCES**

- [1] Remaudiere G. and Remaudiere M. Catalogue of the world's Aphididae. Institut National de la Recherche Agronomique, Paris. 1997, pp 473,
- [2] Singh R., Singh G., Tiwari A.K., Sharma A., Patel S. and Pratibha, *Myzus (Nectarosiphon) persicae* (Sulzer, 1776) (Homoptera: Aphididae): Updated Check List of Host Plants in India. Internat. J. Zool. Investig. 1(1), 8-25 (2015).
- [3] Singh R. and Ghosh S., The glimpses of Indian aphids (Insecta: Hemiptera, Aphididae). Proc. Nat. Acad. Sci., Allahabad, 72B (3-4), 215-234, (2002).
- [4] Ghosh L.K. and Singh R., Biodiversity of Indian insects with special reference to aphids (Homoptera: Aphididae). J. Aphidol. 14, 113-123 (2000).
- [5] Singh R., Singh K. and Upadhyay B.S., Honeydew as a food source for an aphid parasitoid *Lipolexis scutellaris* Mackauer (Hymenoptera: Braconidae.). J. Adv. Zool., 21 (1), 76-83 (2000).
- [6] <http://www.theplantlist.org/1.1/browse/A/Leguminosae/downloaded> on 15.08.2015
- [7] Wang D., Yang S., Tang F. and Zhu, H., Symbiosis specificity in the legume: rhizobial mutualism. Cell Microbiol. 14(3), 334-342 (2012).
- [8] Banerjee H., Ghosh A.K. and Raychaudhuri D.N., On a collection of aphids (Homoptera: Aphididae) from Kullu valley, west Himalaya. Orient. Ins. 3, 255-264 (1969).

- [9] Chakrabarti S. and Sarkar A., A supplement to the food-plant catalogue of Indian Aphididae. J. Aphidol. 15, 9-62 (2001).
- [10] Joshi S. and Poorani J., Aphids of Karnataka. <http://www.aphidweb.com> (2007).
- [11] Sathe T.V. and Jadhav B.V. , Indian Pest Aphids. Daya Publishing House, New Delhi, 2008,,211.
- [12] Kar I., Basu G. and Khuda-Bukhsh A.R., A Check-list of chromosomes in aphids (Homoptera : Aphididae) worked out in India along with the names and families of their host plants. Env. and Ecol. 8(1), 414-428 (1990).
- [13] Jha Y.G., Host plant of aphids (Homoptera : Aphididae) from Ranchi district of Chotanagpur plateau (Bihar) in 10th All India Congress of Zoology, October 14-18, 1998, Eds. B.N. Pandey and B.K. Singh, Daya Publishing House, 1998, 90-94.
- [14] Nayak M.R.C., Basu M. and Raychaudhuri D.N., Parasites and predators of aphids (Homoptera : Aphididae ) from India. Pranikee, 3, 7-14 (1982).
- [15] Krishnamurthi B., Aphididae of Mysore. I. J. Bombay Nat. Hist. Soc. 33, 211-215 (1929).
- [16] Behura B.K., Aphids of India. Survey of published information. Recent Adv. Zool. India 1961, 25-78 (1963).
- [17] Rao S.N. and Kulkarni P.P., Studies on the aphid fauna (Homoptera: Aphididae) of Marathwada (Maharashtra). II. Marathwada Univ. J., Nat. Sci. 16, 141-150 (1977).
- [18] David S.K., Aphids of Mysore. J. South Indian Hort., 6, 67-74 (1958).
- [19] Ghosh L.K., A taxonomic review of the genus *Aphis* Linnaeus in India (Homoptera: Aphididae). Mem. Zool. Surv. India 17, 1-159 (1990).
- [20] David S.K., Notes on South Indian Aphids. III. Lachninae to Aphidinae (part). Indian J. Ent. 19, 171-180 (1957).
- [21] Basu A.N. and Banerjee S.N., Aphids of economic plants of West Bengal. Indian Agric. 2, 89-112 (1958).
- [22] Chakrabarti S., Aphids of north western India with special reference to Kumaon range, Uttar Pradesh , Ph. D. thesis. University of Calcutta, India. Pp. 435, 1972.
- [23] Rao V.P., Survey for natural enemies in India. CIBC. Indian Station, U.S. PL 480 Project, Final Tech. Rep. Pp. 93 (1969).
- [24] Patel R.M. and Patel C.B., Factors contributing to the carry over of ground nut aphid (*Aphis craccivora* Koch) through the off-season in Gujarat. Indian J. Ent. 33, 404-410 (1971).
- [25] Bhalla O.P. and Pawar A.D., A survey of insect and non-insect pests of economic importance in Himachal Pradesh published by Department of Entomology and Zoology, College of Agriculture, Chambaghat, Solan (H.P.), 1980.
- [26] Ganguli R.N. and Ghosh M.R., A note on the aphids of economically importance in Tripura. Sci. and Cult. 31, 541-542 (1965).
- [27] Rishi N.D., Abst. Symp. Recent Trends in Aphidological Studies, Bhubaneswar, p. 52 (1975).
- [28] Raychaudhuri D.N., Taxonomy of the aphids of the Eastern Himalayas, US Pl 480 Project Tech. Report. Pp. 107 (1973).
- [29] Mall N., Srivastava P.N. and Singh R., First record of host plants of aphids (Homoptera : Aphididae) from India. J. Aphidol. 24(1-2), 85-86 (2010).
- [30] Raychaudhuri D.N., Ghosh D., Raychaudhuri D. and Agarwala B.K., Studies on the aphids (Homoptera : Aphididae) from south India. I. Insecta Matsum., n. s. 23, 1-20 (1981).
- [31] Jadhav B.V. and Sathe T.V., On a new species of the genus *Cervaphis* van der Goot (Homoptera: Aphididae). In 9th Nat. Symp. Recent Adv. Aphidol., November 27-29, 2006, Varanasi. Pp. 21-22 (2006).
- [32] Raychaudhuri D., Taxonomy and biology of aphids (Homoptera: Aphididae) of Manipur. Ph. D. Thesis, University of Calcutta, India. Pp. 308 (1978).
- [33] Raychaudhuri D.N., Aphids of North-East India and Bhutan Ed., Zoological Society, Calcutta. Pp. 521 (1980).
- [34] Joshi S. and Poorani J., Aphids of Karnataka. <http://www.aphidweb.com>.

- [35] Ahmad M.E. and Kumar K.M., Food plants and natural enemies of *Aphis craccivora* Koch (Homoptera : Aphididae) in northeast Bihar. J. Aphidol. 21, 61-69 (2006).
- [36] Singh R., Upadhyay B.S., Singh D. and Chaudhary H.C., Aphids (Homoptera: Aphididae) and their parasitoids in North-Eastern Uttar Pradesh. J. Aphidol. 13, 49-62 (1999).
- [37] Ahmad M.E. and Singh R., Food plants associations, seasonal occurrence and parasitoids and hyperparasitoids of few species of *Aphis* Linnaeus from northeastern Uttar Pradesh and Bihar. J. Adv. Zool. 26(1), 41-46 (2005).
- [38] Agarwala B.K., Some aspects of aphid (Homoptera: Insecta) studies in Sikkim and Bhutan. Ph. D. Thesis, University of Calcutta, India. Pp. 383 (1979).
- [39] Lefroy H.M and Howlett F.M., Indian Insect Life - A manual of the insects of the plains (Tropical India), W. Thacker and Co., London, 1909, pp. 743- 748.
- [40] Ghosh A.K., New species and new records of aphids (Homoptera : Aphididae) from Northeast India. Orient. Ins. 8, 161-175 (1974).
- [41] Raha S.K., Studies on the aphids (Homoptera: Insecta) of Nagaland, Ph. D. Thesis, University of Calcutta, India. Pp. 212 (1979).
- [42] Raha S.K. and Raychaudhuri D.N., Studies on the aphids (Homoptera: Aphididae) of Nagaland. Entomon, 6, 317-323 (1981).
- [43] Behura B.K., Supplement to aphids of India - a survey of published information. Prakruti – J. Utkal Univ. Sci. 3, 40-65, (1965(1963)).
- [44] Krishnamurthi B., Aphididae of Mysore. II. J. Bombay Nat. Hist. Soc. 34, 411-419 (1931).
- [45] Agrawal R., Singh Rajni and Singh R., New records of host plants of *Myzus persicae* (Sulzer, 1776) (Homoptera: Aphididae) in northeastern Uttar Pradesh. In 9th Nat. Symp. Recent Adv. Aphidol., November 27-29, 2006, Varanasi. p. 31. (2006).
- [46] Sathe T.V. and Jadhav B.V., Indian Pest Aphids. Daya Publishing House, New Delhi. 2008, pp. 211.
- [47] Ahmad M.E. and Singh R., Seasonal abundance of aphids, *Rhopalosiphum* and their parasitoids on plants of economic importance from Northeastern Uttar Pradesh. J. Adv. Zool., 15, 116-119 (1994).
- [48] [47] Ghosh A.K. and Agarwala B.K., The fauna of India and the adjacent countries – Part 6. Subfamily : Greenideinae. Zoological Survey of India. 1993, pp.1-330.
- [49] Banerjee S.N. and Basu A.N., Aphididae of West Bengal. Curr. Sci. 24, 61 (1955).
- [50] Agrawal R., Singh K., Upadhyay B.S. and Singh R., New records of host plants of *Aphis gossypii* Glover, 1877 (Homoptera: Aphididae) from northeastern Uttar Pradesh. In 9th Nat. Symp. Recent Adv. Aphidol., November 27-29, 2006, Varanasi. pp. 30- 31. (2006).
- [51] Agrawal R. and Singh R., New host records of aphids (Homoptera : Aphididae) in northeastern Uttar Pradesh. J. Aphidol. 19 (1-2), 109-111 (2005).
- [52] Bhatt N.A., Borad P.K., Darji V.B. and Jani J.J., Activity of natural enemies of *Uroleucon compositae* (Theobald) infesting ornamental plants *Gaillardia pulchella* Foug. In 9th Nat. Symp. Recent Adv. Aphidol., November 27-29, 2006, Varanasi. p. 4. (2006).
- [53] Chakrabarti S., Ghosh A.K. and Raychaudhuri D.N., A new genus, a new species and further records of aphids (Homoptera: Aphididae) from the Kumaon hills, northwest Himalaya, India. Orient. Ins. 6, 387-400 (1972).
- [54] Mondal P.K., Basu R.C. and Raychaudhuri D.N., Studies on the aphids (Homoptera : Aphididae) from eastern India. XXX. The Genus *Toxoptera*. Orient. Ins. 10, 533-540 (1976).
- [55] Ghosh A.K. and Agarwala B.K., Weed hosts of major aphid (Homoptera : Insecta ) pests in India region. Indian Agric., 24, 101-107 (1980).
- [56] Chakrabarti S., Revision of the Drepanosiphinae (Homoptera : Aphididae) from the Indian sub-region. Orient. Ins. 22, 1-86 (1988).
- [57] Ghosh A.K. and Raychaudhuri D.N., Aphids (Insecta: Homoptera) of Sikkim. Proc. Zool. Soc. Calcutta, 21, 179-195 (1968).
- [58] George C.J., South Indian Aphididae. J. Asiatic Soc. Bengal, (N.S.), 23, 1-12 (1927).

- [59] Ghosh A.K. and Raychaudhuri D.N., A preliminary accounts of the bionomics and taxonomy of aphids from Assam. J. Bombay Nat. Hist. Soc. 59, 238-253 (1962).
- [60] Ghosh L.K., A note on the preliminary survey of aphids (Homoptera) from Bihar, India. Sci. and Cult. 36, 419-420 (1970).
- [61] Agarwal R., Trivedi M. and Gaur R., Records of food plants of *Aphis craccivora* Koch, 1854 (Homoptera: Aphididae) from northeastern Uttar Pradesh. In 9th Nat. Symp. Recent Adv. Aphidol., November 27-29, 2006, Varanasi. p. 29. (2006).
- [62] Basu R.C., Ghosh M.R. and Raychaudhuri D.N., The genus *Betacallis* with special reference to the species from Northeast India (Homoptera: Aphididae). Orient. Ins. 8, 233-238 (1974).
- [63] Raychaudhuri D.N., Ghosh L.K. and Das S.K., Studies on the aphids (Homoptera: Aphididae) from north and northwest India-I. Insecta Matsum., n. s., 20, 1-42 (1980).
- [64] Ghosh A.K., Taxonomical notes on some species of Indian aphids (Homoptera : Aphididae). Orient. Ins. 7, 347-350 (1973).
- [65] Ghosh A.K. and Raychaudhuri D.N., Further records of aphids (Homoptera: Insecta) from NEFA. Sci. and Cult. 37, 483-484 (1971).
- [66] Maity S.P. and Chakrabarti S., Aphids (Homoptera: Aphididae) of northwest India. III. Records of new aphids from Garhwal Himalaya. Sci. and Cult. 45, 160-162 (1979).
- [67] Sen A.K., Bhattacharya A. and Srivastava S.C., Record of *Aphis craccivora* Koch and *Aphis gossypii* Glover (Fam.: Aphididae) on *Moghania macrophylla*, a host plant of lac insect. Entomon, 12, 229 (1987).
- [68] Laskar N. and Ghimiray T.S., Varietal and biophysical reactions of soybean to potato leaf hopper, *Empoasca fabae* (Harris) and green peach aphid, *Myzus persicae* (Sulz.). J. Appl. Zool. Res. 15, 1-3 (2004).
- [69] Ghosh L.K., A Conspectus of Aphididae (Homoptera) of Himachal Pradesh in North-west Himalaya, India. Zoological Survey of India, Tech. Monograph 6, pp.1-282 (1986).
- [70] Ghosh L.K., A study on the aphids (Homoptera: Aphididae) of Himachal Pradesh in North-West Himalaya, India, Ph. D. Thesis, University of Calcutta, India. Pp. 360 (1977).
- [71] Bhagat R.C., New records of the aphids (Homoptera: Aphididae) from Kashmir (India). Sci. and Cult. 47, 134-136 (1981).
- [72] David S.K., Additional notes on some aphids in Madras State. Madras Agric. J. 43, 103-107 (1956).
- [73] Bhattacharya D.K., *Indumasonaphis chakrabartii*, a new aphid (Homoptera : Aphididae) from Northeast India. Proc. Zool. Soc. Calcutta, 44, 127-130 (1991).
- [74] Ghosh A.K., Banerjee H. and Raychaudhuri D.N., Aphids (Homoptera: Aphididae) collected from Kameng district, NEFA. Gaveshana 3, 10 (1971).
- [75] Chakrabarti S. and Bhattacharya D.K., New genus and species of aphids (Homoptera, Aphididae) from north-western Himalaya. Ann. Zool. 36(28), 539-547 (1982).
- [76] Agarwala B.K. and Raychaudhuri D.N., Note on some aphids affecting economically important plants in Sikkim. Indian J. Agric. Sci. 51, 690-692 (1981).
- [77] Agarwal R., Fatima Z. and Kumar U., Additional records of food plants of *Aphis fabae solanella* Theobald, 1914 (Homoptera: Aphididae) from northeastern Uttar Pradesh. In 9th Nat. Symp. Recent Adv. Aphidol., November 27-29, 2006, Varanasi. p. 4. (2006).
- [78] Rizvi S.M.A. and Paul Khurana S.M., Aphid fauna of economic crop plants in Gorakhpur. Sci. and Cult. 36, 49 (1970).
- [79] Das B.C. and Chakrabarti S., Seasonal occurrence of *Aphidius matricariae* Haliday (Aphidiidae: Hymenoptera) in Garhwal range of northwest Himalaya. Indian J. Ent. 50, 388-389 (1988).
- [80] Rao S.N. and Kulkarni P.P., Indian root aphids. Marathwada Univ. J. Nat. Sci. 14, 189-192 (1975).
- [81] Verma K.D., Additional records of Jammu and Kashmir aphids. Sci. and Cult. 37, 248-249 (1971).
- [82] Raychaudhuri D.N., Poddar S.C. and Raychaudhuri D., Study of the genus *Aphidius* (Hymenoptera: Aphidiidae) of India. Entomon, 7, 11-22 (1982).

- [83] Verma A.N., Khurana A.D. and Bhanot J.P., Aphids of Hissar (Haryana). Haryana Agric. Univ. J. Res. 5, 11-14 (1975).
- [84] Ghulam-Ullah, Studies of Indian Aphididae - I: The Aphid fauna of Delhi. Indian J. Ent. 2, 13-25 (1940).
- [85] Bhagat R.C., New records and hosts of aphid parasitoids (Hymenoptera : Aphidiidae) from Kashmir, India. J. Bombay Nat. Hist. Soc. 81, 93-98 (1984).
- [86] David S.K. and Ghorpade K.D., Two species of aphids (Homoptera: Aphididae) new to India and four others new to southern India. Orient. Ins. 8, 195-198 (1974).
- [87] Krishnamurthi B., Aphididae of Mysore. I. J. Bombay Nat. Hist. Soc. 33, 211-215 (1929).
- [88] Despande V.G., A preliminary account of the Aphididae of Poona. J. Bombay Nat. Hist. Soc. 39, 740-744 (1938).
- [89] David S.K., A taxonomic review of Macrosiphum in India. Orient. Ins. 9, 461-493 (1975).
- [90] Ghosh A.K. and Raychaudhuri D.N., Studies on the aphids (Homoptera: Aphididae) from eastern India. XIII. New species and further new records from Assam. Orient. Ins. 6, 371-386 (1972).
- [91] Singh O.L. and Singh T.K., The aphids (Homoptera: Aphididae) of Mizorum. In Aphidology in India, ed. B.K. Agarwala, Proc. Nat. Symp. Aphidol. India, Agartala, 2-4 Nov. 1985, 71-73 (1985).
- [92] Chakrabarti S. and Raychaudhuri D.N., Callipterine aphids (Homoptera : Aphididae) of North-east India and Bhutan. Proc. Zool. Soc., Calcutta 28, 71-101 (1975).
- [93] Chakrabarti S., Ghosh A.K. and Raychaudhuri D.N., Three new species of aphids (Homoptera : Aphididae) from northeast Himalayas, India. Kontyu, 39, 368-372 (1971).
- [94] Agarwala B.K., Raychaudhuri D. and Raychaudhuri D.N., Parasites and predators of aphids in Sikkim and Manipur (Northeast India). III. Entomon, 5, 39-42 (1980).
- [95] Behura B.K. and Roy D.K., Host plants of *Aphis gossypii* Glover. News Letter, Aphidol. Soc., India, 1(2), 3 (1980).
- [96] Stary P. and Raychaudhuri D.N., Aphid parasitoids (Hymenoptera : Aphidiidae) from northwestern India. Orient. Ins. 16, 297-304 (1982).
- [97] Bhagat R.C., On aphids (Homoptera: Aphididae) and their parasitoids (Aphidiidae: Hymenoptera) infesting forest trees in Kashmir valley, India. Indian Forester, 111, 467-474 (1985).
- [98] Poddar S.C. and Ghosh A.K., Bionomics of an aphidophagous coccinellid predator *Pseudaspidimerus circumflexa* (Motschulsky) (Coccinellidae : Aspidimerini). Rec. Zool. Surv. India, 81, 67-76 (1984).
- [99] Sengupta G.C., Das J.N. and Behura B.K., A preliminary account of the aphids of Orissa. Prakruti – J. Utkal Univ., Nat. Sci., 2, 33-39 (1962).
- [100] David S.K., Notes on South Indian Aphids. Indian J. Ent. 18, 1-9 (1956).
- [101] Krishnamurthi B., Aphididae of Mysore. III. Indian J. Ent. 10, 51-53 (1948).
- [102] Verma K.D. and Singh H.V., *Sophora tementosa* - A new host for *Macrosiphum (Acyrtosiphon) gossypii* Mordv. (Homoptera : Aphididae). Curr. Sci. 44, 368 (1975).
- [103] Chakrabarti S., Ghosh A.K. and Raychaudhuri D.N., New Records of Aphids (Insecta : Homoptera) from Uttar Pradesh, India. Sci. and Cult. 37, 247-248 (1971).
- [104] Chakrabarti S., Saha S. and Mandal A.K., *Longisiphoniella subterranea* gen. et. sp. nov. and hitherto unknown aphids (Homoptera : Aphididae) from Garhwal range of Western Himalaya. Proc. Zool. Soc., Calcutta 37, 35-44 (1988).
- [105] Ahmad M.E. and Singh R., Records of Macrosiphini of Northeastern Uttar Pradesh and its relationship with food plants and natural enemies. J. Aphidol. 9, 80-86 (1995).
- [106] Ghosh A.K. and Raychaudhuri D.N., Aphids of Rajasthan. II. Indian Agric. 4, 228-229 (1962).
- [107] Behura B.K., Aphids of India. Survey of published information. Recent Adv. Zool., India, 1961, 25-78 (1963).
- [108] Ghosh A.K. and Quednau F.W., The Fauna of India and the Adjacent Countries : Homoptera: Aphidoidea, Part 5. Subfamily: Drepanosiphinae. Zoological Survey of India, Kolkata. 1990. Pp. 336.

- [109] Ghosh A.K., One new and some rare species of aphids (Homoptera: Aphididae) from northeast India. *Orient. Ins.* 12, 97-102 (1978).
- [110] Bisht R.S., Rana D.S. and Katoch A.R., Records of aphidicolous ants (Hymenoptera: Formicidae) from Garhwal hills, Uttranchal. *J. Aphidol.* 16, 15-19 (2002).
- [111] Ghosh, A.K. and Raychaudhuri D.N. Aphids of Calcutta and its suburbs (West Bengal). *J. Bombay Nat. Hist. Soc.* 56, 660-664 (1959).
- [112] Ghosh L.K., On a collection of aphids (Homoptera: Aphididae) from Uttar Pradesh, India. *Sci. and Cult.* 35, 493-494 (1969).
- [113] Ghosh L.K., Aphids of NEFA, India (Homoptera : Aphididae). *Sci. and Cult.* 36, 562-563 (1970).
- [114] Ghosh A.K. and Raychaudhuri D.N., Aphids of Calcutta and its suburbs (West Bengal). *J. Bombay Nat. Hist. Soc.* 56, 660-664 (1959).
- [115] Chakrabarti S. and Raychaudhuri D.N., Hitherto unknown morphs of two species of aphids (Homoptera: Aphididae) described from India. *Indian J. Ent.* 36, 128-131 (1974).
- [116] Ghosh A.K., Ghosh M.R. and Raychaudhuri D.N., Studies on the aphids (Homoptera: Aphididae) from eastern India XI. Descriptions of hitherto unknown or newly recorded sexual morphs of some species from West Bengal. *Orient. Ins.* 6, 333-342 (1972).
- [117] Chakrabarti S. and Raychaudhuri D.N., Hitherto unknown morphs of two species of aphids (Homoptera: Aphididae) described from India. *Indian J. Ent.* 36, 128-131 (1974).
- [118] Singh R., Agrawal R. and Pandey S., Records of aphids infesting Indian medicinal plants. *J. Aphidol.* 17, 1-58 (2003).
- [119] Sanjappa M., Legumes of India, Botanical Survey of India, Calcutta, 1990.

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