APPENDIX A. Table 1 references and a compendium of natural history notes on insect-entrapping plants.

A great many plants are noted in descriptions and keys as “sticky”, “glandular”, “viscid”, “resinous”, or “glandular-sticky” and common specific epitaphs include “viscosum”, “glandulosus”, “resinosus” and others. However stickiness does not necessarily imply insect entrapment. A notable example is the sticky monkeyflower, *Mimulus aurantiacus*, common throughout much of California, which, to a human touch, is extremely sticky, yet the senior author has observed many insects moving without difficulty on its surfaces and never once observed an entrapped insect. Other species, notably *Micranthes californicus*, the California saxifrage, are not sticky to a human touch, yet entrap large numbers of insects. The list in the table and the references and observations compiled here by E. LoPresti are certainly incomplete, this is simply an attempt to compile the insect entrapment literature and personal and internet observations, whether photographic or verbal, as to foster further research on these interesting plants. Photographs are copied here for reference when legally permitted, and all observations are either quoted from sources referenced or by the author (EFL). Many photographs are identified only to genus and the author tried his best to check the genus of photographs on the internet, yet a few misidentifications may have persisted.

This list can be considered an extension of that made by William Kirby and William Spence in their seventh edition of “Introduction to entomology or elements of the natural history of insects” published in 1856 (Longman, Brown, Green, Longman & Roberts, London), building upon a brief note by Benjamin Barton in 1812 (Philos. Mag. 39: 107-116). In it, they note: “You know well that some plants are gifted with the faculty of catching flies. These vegetable Muscicapae [a family of flycatching birds], which have been enumerated by Dr. Barton of Philadelphia, who has published an ingenious paper on the subject, may be divided into three classes: - First, those that entrap insects by the irritability of their stamina, which close upon them when touched [e.g. latex or resin secretion]…. The second class includes those with entrap them by some viscosity of the plant… And under the third class will arrange those which ensnare by their leaves, whether from some irritability in them… or merely from their forming hollow vessels containing water… or sweet fluid."

Kirby and Spence wondered about the utility of insect entrapment, stating: "As nothing, however, is made in vain, there can be little doubt that these ensnared insects are subservient to some important purpose in the economy of the plants which are endowed with the faculty of taking them, though we may be ignorant what that purpose is". Nearly twenty years later, Darwin also touched upon on this question, mentioning lack of nutritional benefit derived by non-carnivorous plants which entrap insects, stating "Many plants cause the death of insects… without thereby receiving, as far as we can perceive, any advantage", though he did not speculate on an adaptive value. Not long after Darwin, Paul Kerner (1878: ref. 81) wrote a chapter about sticky inflorescences and their adaptive value noting protection against herbivores as likely the primary purpose. These references and many more are included below.

Table references

1: A *Glandularia* sp. encountered near Parque Nacional Tres Cruces, Chile, had some entrapped insects on leaves and stem. Photo: EFL

2: Strathcona Wilderness Institute. Photo Day – *Tofeldia glutinosa*. http://3.bp.blogspot.com/_0LEQXcze7Og/TEPL4uMbH-I/AAAAAAAAAMY/uDaI7XUOv24/s1600/asphodel.jpg accessed 11-May-2015

3: Helms, N. *Wachendorfia brachyandra*. http://www.ispotnature.org/sites/default/files/images/40606/1a944128bd0796c7da9ffc404ea4185b.jpg accessed 4-May-2014. Entrapped fly below flower.

4: Montiero, RF and MV Monceda. 2014. First report on the diversity of insects trapped by a sticky exudate on the inflorescenses of *Vriesea bituminosa* Wawra (Bromeliaceae: Tillandsioideae). Arthropod-Plant Interactions 8: 519-523.

5: Spomer, G. G. 1999. Evidence of protocarnivorous capabilities in *Geranium viscosissimum* and *Potentilla arguta* and other sticky plants. International Journal of Plant Sciences 160:98-101.

6: Licher, M. *Brickellia microphylla var. scabra* http://swbiodiversity.org/seinet/imagelib/imgdetails.php?imgid=218358 accessed 4-May-2015

7: *Leucheria* spp. often have 10+ insects caught on peduncles, pedicels, and calyxes. Photos: EFL

8: Willson, MF, Anderson, PK & PA Thomas. 1983. Bracteal exudates of two *Cirsium* species as possible deterrents to insect consumers of seeds. American Midland Naturalist 110: 212-214

9. B. Krimmel, pers. comm.

10: *Mirabilis* spp. in the lab catch 10’s to 100’s of arthropods on sticky-glandular stems, those in the field or as ornamentals in the garden often exceed those figures by at least an order of magnitude. Photo: EFL

11: Villagra, CA, Meza, AA & Urzua, A. 2014. Differences in arthropods found in flowers versus trapped in plant resins on *Haplopappus platylepis* Phil. (Asteraceae): Can the plant discriminate between pollinators and herbivores? Arthropod-Plant Interactions 8:411-419

It is likely that insects become entrapped in the resins of *Hazardia* spp., a genus which is closely related, and morphologically similar, to *Haplopappus*. The authors have not been able to inspect any *Hazardia* spp. at this time.

12: Rodriguez, Francisco. *Heracium amplexicaule*. http://www.biodiversidadvirtual.org/herbarium/Hieracium-amplexicaule-2d2.-img174665.html accessed 4-May-2015

13: Morse, K. *Layia glandulosa*. http://calphotos.berkeley.edu/cgi/img_query?enlarge=0000+0000+1208+1930 accessed 4-May-2015

14: Walden, GK. *Phacelia pedicellata* http://calphotos.berkeley.edu/cgi/img_query?enlarge=0000+0000+0712+1076 accessed 4-May-2015

15: Romero, G., J. Souza, and J. Vasconcellos-Neto. 2008. Anti-herbivore protection by mutualistic spiders and the role of plant glandular trichomes. Ecology 89:3105–3115.

16: Chase, M. 2009. Murderous plants: Victorian Gothic, Darwin and modern insights into vegetable carnivory. Botanical Journal of the Linnean Society 161:329–356.

17: B. Krimmel, pers. comm.

18: Brittnacher, J. Murderous Plants http://www.carnivorousplants.org/cp/MurderousPlants.php accessed 7-May-2014

19: Eisner, T., M. Eisner, and E. R. Hoebeke. 1998. When defense backfires: Detrimental effect of a plant's protective trichomes on an insect beneficial to the plant. Proceedings of the National Academy of Sciences of the United States of America 95:4410-4414.

20: Eisner T and DJ Aneshansley. 1983. Adhesive strength of the insect-trapping glue of a plant (*Befaria racemosa*). Annals of the Entomological Society of America 76: 295-298.

21: Diggs, GM Jr. 1988. New subspecies in *Comarostaphylis discolor* (Ericaceae, Arbuteae) from Jalisco, Mexico. Bulletin of the Torrey Botanical Club 115: 203-208

22: Krimmel, BA & AG Wheeler Jr. 2015. Host-plant stickiness disrupts novel ant-mealybug association. Arthropod-plant Interactions 9:187-195

Nick Helme estimates that as many as 150 species of Erica may be sticky (pers. comm.).

23: Sugiura, S., and K. Yamazaki. 2006. Consequences of scavenging behaviour in a plant bug associated with a glandular plant. Biological Journal of the Linnean Society 88:593–602.

24: Cook, DL. *Allophyllum integrifolum*. http://calphotos.berkeley.edu/cgi/img_query?enlarge=0000+0000+0513+0775 accessed 7-May-2015

25: *Polemonium occidentale* at Sagehen Creek Reserve, Nevada County, California, entraps small numbers of insects, mostly in the inflorescences, which are glandular. Photo: EFL.

26: Plancho, BJ, Adamec, L & H. Huet. 2009. Mineral nutrient uptake from prey and glandular phosphatase activity as a dual test of carnivory in semi-desert plants with glandular leaves suspected of carnivory. Annals of Botany 104: 649-654

27: Asai, T, Hara, N & Y Fujimoto. 2010. Fatty acid derivatives and dammarane triterpenes from the glandular trichome exudates of *Ibicella lutea* and *Proboscidea louisiana*. Phytochemistry 71: 877-894.

28: Bosabalidis, AM & M. Skoula. 1998. A Comparative Study of the Glandular Trichomes on the Upper and Lower Leaf Surfaces of *Origanum xintercedens* Rech. Journal of Essential Oil Research. 10: 277-286.

29: Several *Salvia* spp. entrap insects on glandular aerial parts, including the commonly-planted *S. spathacea* (hummingbird sage), UC-Davis Arboretum, Davis, CA. Photo: EFL.

30: Kobayashi, S; Asai, T; Fujimoto, Y and S. Kohshima. 2008. Anti-herbivore structures of *Paulownia tomentosa*: morphology, distribution, chemical constituents and changes during shoot and leaf development. Annals of Botany 101: 1035-1047

31: Cosgrove, M. *Stemodia viscosa*. http://www.plantsystematics.org/imgs/meredith/r/Plantaginaceae_Stemodia_viscosa_38519.html accessed 7-May-2015

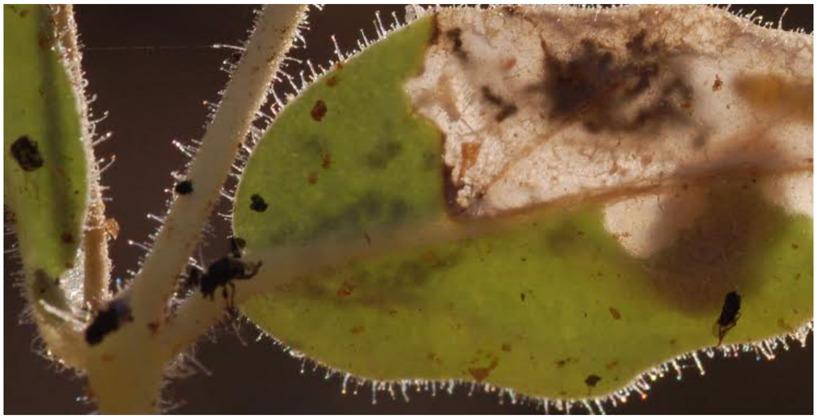
32: iSpotNature. *Lyperia lychnidea*. http://www.ispotnature.org/sites/default/files/images/41362/72ae42f3819055b0ced586ee78179ed9.jpg accessed 11-May-2015

33: Belov, M. *Spergularia* sp. http://www.chileflora.com/Florachilena/FloraEnglish/HighResPages/EH1701.htm accessed 12-May-2015

I also noticed some glandular *Spergularia* sp. with small numbers of entrapped insects growing in a small stand among *Nicotiana* spp. in the Atacama region of Chile, though the referenced photo of a flower bud with many entrapped insects is more striking. Photo: EFL

34: Wursten, BT *Limeum viscosum.* http://www.zimbabweflora.co.zw/speciesdata/image-display.php?species_id=122830&image_id=8 accessed 4-May-2015

35: Like many Nyctaginaceae, *Allionia* spp. entrap many insects. Photo: Charley Eisemann.



36: Barber, JT. 1978. *Capsella bursa-pastoris* seeds. Are they carnivorous? Carnivorous Plants Newsletter 7: 39-42

37: Feldman, TS. *Chapmannia*. http://www.tracysfeldman.com/chapmania.jpg accessed 4-May-2014

38: Garden Web. http://forums.gardenweb.com/forums/load/botany/msg0806473721277.html?56 accessed 4-May-2014

39: Sutherst, RW, Jones, RJ & HJ Schnitzerling. 1982. Tropical legumes of the genus Stylosanthes immobilize and kill cattle ticks. Nature 295: 320-321.

40: Corcuera, P, Valverde, PL and Jimenez-Salinas, E. 2010. Distribution of *Peucetia viridans* (Araneae: Oxyopidae) on *Croton ciliatoglandulifer*. Environmental Entomology 39: 320-327.

41: Armstong, WP. *Dalechampia*. http://waynesword.palomar.edu/images/dalech2b.jpg accessed 4-May-2015

42: Royal Botanical Gardens Kew, herbarium specimen #K000373246, http://www.kew.org/herbcatimg/264913.jpg accessed 7-May-2014

43: Gruenhagen, NM and TM Perring. 1999. Velvetleaf: a plant with adverse impacts on insect natural enemies. Economic Entomology 28: 884-889.

44: Hyde, MA. *Hermannia glanduligera*. http://www.zimbabweflora.co.zw/speciesdata/image-display.php?species_id=139930&image_id=2 accessed 7-May-2014

45: Morais-Filho, JC and GQ Romero. 2008. Microhabitat use by *Peucetia flava* (Oxyopidae) on the glandular plant *Rhyncanthera dichotoma* (Melastomataceae). The Journal of Arachnology 36: 374-378.

46: R. Karban, pers. comm.

47: Lund, B. http://heritage.nv.gov/sites/default/files/images/species/anlest83.jpg accessed 7-May-2015

48: Braun, AF. 1919. Notes on Cosmopterygidae, with descriptions of new genera and species (Microlepidoptera). Entomological News. 30: 260-264.

Amarasinghe, V, Graham, SA & Graham, A. 1991. Trichome morphology in the genus *Cuphea* (Lythraceae). Botanical Gazette 152: 77-90.

On *Psacaphora metallifera*, Annette F. Braun, an extremely competent and underappreciated naturalist who devoted her life to microlepidoptera and who described ~2.5% of all North American moths known to date, writes “the larvae often crawls for a couple of inches with the greatest ease amongst the extremely viscid hairs of [*Cuphea*], in which ants and small flies are often caught and held fast”.

Amaransighe et al (1991) write “In *Cuphea*, resins [from glandular trichomes] function very well in trapping crawling insects… These insects are commonly seen held in the exudate of young stems and flowers”.

49: The sticky berries of *Rhus integrifolia* (lemonade berry) of southern California, entrap small insects, B. Krimmel, pers. comm..

50: Photo in Figure 1.

51: *Calceolaria* sp. near Parque Nacional Nevado Tres Cruces, Chile. Photo: EFL

52: *Cerastium glomeratum*, sticky chickweed, entraps many insects in its hirsute stems and leaves. In a brief check, I found none of the normal sticky plant predators present. It flowers much earlier than the tarweeds and columbines and thus may have a different insect community associated with it. UC-Davis McLaughlin Reserve, Yolo County, California. Photo: EFL

53: Several *Adesmia* sp. the senior author has observed entrap insects in glandular trichomes. Photo taken near Parque Nacional Tres Cruces, Chile. Photo: EFL.

54: Simmons, AT; Gurr, GM; McGrath, D; Martin, PM; and HI Nicol. 2004. Entrapment of *Helicoverpa armigera* (Hubner) (Lepidoptera: Noctuidae) on glandular trichomes of *Lycopersicon* species. Australian Journal of Entomology 43: 196-200

Lycopersicon has since been synonymized with *Solanum*.

55: *Abronia latifolia* at the UC-Davis Bodega Bay Reserve catches small numbers of insects, especially on the glandular trichomes of the inflorescences, but also on sticky stems and petioles (though this is usually prevented by the complete covering of sand on these structures). Other *Abronia* species also entrap small numbers of insects. Photo: EFL.

56: *Parentucellia viscosa* is a common introduced species in coastal Chile and California and some individuals catch a great deal of carrion (~10-100 on a small plant), while others catch little to none. It seems an excellent system for using natural variation to examine the costs and benefits of entrapment as the natural variation is more pronounced than in many other sticky plants which I've examined. Photo: EFL, Puerto Montt, Chile.

57: All *Collomia* spp. the author has observed in California and Chile all entrap insects in small numbers and host scavenging bugs. Pictured below are *C. biflora*, Parque Nacional Ingles, Chile, and *C. diversifolia*, UC-Davis McLaughlin Reserve, Napa, California. Photos: EFL.

58: I have observed *Microsteris gracilis* several times in the Sierra Nevada of California and it often has small numbers of insects entrapped on glandular-sticky calyxes and terminal leaves.

59: Romeis, J, Shanower, TG & CPW Zebitz. Physical and chemical plant characters inhibiting the searching behavior of *Trichogramma chilonis*. Entomologia Exerimentalis et Applicata 87: 275-284.

“Out of the 65 parasitoid placed on [*Cajanus*] pods, 51 (78.5%) were trapped and killed by the exudates.”

60: Pertwee, RG. 2014. Handbook of *Cannabis*. Oxford University Press, Oxford, U.K.

“Struggling insects are frequently found trapped to the resin heads of these trichomes, thereby inhibiting them from further feeding and reproduction (Fig. 4.3b [photo of aphids entrapped]).”

61: Kellogg, DW, Taylor, TN & M Krings. Effectiveness in defense against phytophagous arthropods of the cassabanana (*Sicana odorifera*) glandular trichomes. Entomologia Experimentalis et Applicata 103: 187-189.

“*Aphis nerii* (1–3 mm long) was the only arthropod observed to be effectively entrapped by the glandular trichomes of *S. odorifera*. In the course of several hours, the secretion gradually accumulated on the legs, and after about 20 h on the leaf, the tarsi and pretarsi were completely encased within a thick layer of solidified secretion.”

62: Vasconcellos-Neto, J, Romero, GQ, Santos, AJ & AS Dippenaar-Schoeman. 2006. Associations of spiders of the genus *Peucetia* (Oxyopidae) with plants bearing glandular hairs. Biotropica 39: 221-226.

“[A lynx spider] is found mainly on *Helichrysum cooperi*, a common South African plant with very sticky leaves on which thousands of insects are trapped”

63: Riddick, EW & Z Wu. 2010. Lima bean-lady beetle interactions: hooked trichomes affect survival of Stethorus punctillum larvae. BioControl 56: 55-63

64: van Dam, NM & JD Hare. 1998. Differences in distribution and performance of two sap-sucking herbivores on glandular and non-glandular *Datura wrightii*.

"After the whitefly adults had landed on the leaves of these [glandular-sticky] plants, they were trapped in the exudate and died."

65: Lach, L. 2013. A comparison of floral resource exploitation by native and invasive Argentine ants. Arthropod-plant Interactions. 7: 177-190.

"I had previously considered that sticky bracts may be a deterrent to ant foraging given the number of dead stuck ants I had observed. However, the positive association with sticky bracts indicates that the copious nectar causing the stickiness was a strong attractant"

66: Johnston, B. A close-up view of dwarf mountain laurel. http://www.microscopy-uk.org.uk/mag/indexmag.html?http://www.microscopy-uk.org.uk/mag/artmay12/bj-MountainLaurel.html accessed 8-May-2015

"One result of this phenomenon is that insects that happen to alight on any of the plant's surfaces are instantly trapped by the sticky glue. The small insect shown in the sequence of images that follows tried valiantly, and ultimately unsuccessfully, for over an hour to escape its adhesion to a bud stalk."

67: Darwin, C. 1875. Insectivorous plants.

"Many plants cause the death of insects, for instance the sticky bugs of the horse-chestnut (*Aesculus hippocastanum*), without thereby receiving, as far as we can perceive, any advantage"

“The glands [of saxifrage] secrete a yellish viscid fluid, by which minute Diptera are sometimes, though not often, caught…. In the case of *Saxifraga tridactulites*, Mr. Druce says… he examined some dozens of plants, and in almost every instance remnants of insects adhered to the leaves. So it is, I hear from a friend, with this plant in Ireland.”

“The pedicels [of *Erica tetralix*]… support rather large globular heads [of glandular trichomes], secreting viscid matter, by which minute insects are occasionally, though rarely, caught.”

“The stems and both surfaces of the leaves [of *Mirabilis longiflora*] bear viscid hairs. Young plants, from 12 to 18 inches in height in my greenhouse, caught so many minute Diptera, Coleoptera, and larvae, that they were quite dusted with them.”

“[*Nicotiana tabacum*] is covered with innumerable hairs of unequal lengths, which catch many minute insects.”

68: Chambers, W. & R. Chambers. 1893. “Flowers as entertainers”. Chambers Journal of Popular Literature, Science and Arts. 10: 303-304.

“Pluck a sprig of stinking groundsel (“*Senecio viscosus*”) or rest-harrow (“*Ononis arvensis*”), which are common everywhere, and the stickiness of the plant will at once attract attention... The stickiness already noted is a protection against the visits of unwelcome guests, and acts in a directly opposite way to the varnish-like coating which has been referred to, since, while the latter slide wingless insects off the stem, the former causes them to adhere, and they become so firmly entangled that they perish before they can reach the flower”

69: The peduncle and pedicels of *Micranthes californicus* in California’s coast range entrap large numbers of insects for such a small plant. While not sticky to the touch, small glandular trichomes visible with a hand lens must be the entrapping agent. There is a significant negative relationship between aphid abundance and entrapped carrion, though we have not yet tested any mechanistic hypotheses for this pattern (LoPresti and Charles, unpublished data). Photo: EFL

70: *Verbascum blattaria* has glandular trichomes covering the peduncle, pedicels and calyx which catch small insects. This phenomenon occurs in both Chile and California, both outside of its native range Photo: EFL

71: Domestic *Calibrachoa* spp. (million bells) entrap some insects on their glandular leaves and stems, though not nearly as many as the closely related *Petunia* (EFL, pers. obs.).

72: All aerial parts of *Salpiglossis sinuata*, much like related *Nicotiana* and *Schizanthus*, are sticky and entrap large and small insects. Photo: EFL

73: *Schizanthus* spp. entrap many insects on glandular trichomes on peduncles and reproductive structures. Unlike *Nicotiana*, *Aquilegia* and many other genera, the leaves are non-sticky. *Schizanthus hookeri* photo: EFL.

74: *Euphrasia flavicans* entraps a few small insects in its slightly sticky inflorescences (pers. obs.). Photo (and apologies for quality): EFL

75: *Lessingia ramulosa* at the UC-Davis McLaughlin reserve is extremely sticky, yet rarely entraps insects. The entrapped insects are all extremely small (< 2mm). Photo: EFL

76: *Grindelia* spp. entrap small numbers of insects on their sticky calyxes. While each calyx may only have 1-5 insects entrapped, the whole plant usually has dozens of flowers, leading to large numbers on the shrub. Many of the sticky plant scavengers on columbine, including *Hoplinus* and *Pselliopus* are found on *Grindelia* spp. as well, though it hosts other as-of-yet unidentified true bugs as well. Photo: EFL

77: *Hemizonia* spp. entrap large numbers of carrion and host the same scavenging insects as *Madia* spp. and the columbine detailed in this study. It also is consumed by *Heliothis phloxiphaga* and other Heliothine noctuids at McLaughlin reserve; an unidentified noctuid (likely a eustrotine, David Wagner, pers. comm.) feeds only on nonsticky basal rosette leaves. Photo: EFL.

78: *Kyhosia bolanderi* was formerly placed in *Madia*, but is now a monotypic genus. Like *Madia*, it catches insects on all aerial surfaces. A representative photo of a fly entrapped on a calyx is referenced.

Morse, K. *Kyhosia bolanderi*. http://calphotos.berkeley.edu/cgi/img_query?enlarge=0000+0000+0110+2868 accessed 19-May-2015

79: *Holocarpha* spp. catch much less carrion than their close relatives *Madia* and *Hemizonia*, but still some. They also host the standard predators (e.g. *Hoplinus, Mecaphesa schlingeri* [second photo]) and commonly tree crickets (*Oecanthus* sp.), which are also scavenging predators of sticky plants, often encountered on tarweeds though not often found on columbines. Photos: EFL.

80: Casey Peters, pers. comm. At UC-Santa Cruz, Big Creek Reserve, *Hulsea heterochroma* was "covered in little flies".

81: Kerner, A. J. 1878. Flowers and their unbidden guests. Kegan Paul and Co. London.

"I will simply remind the reader that not a few of the Caryophyllaceae bear names which at once indicate the viscidity of their peduncles and stems, and point to the fact that small insects stick to them. Such are *Silene miscipula* L., *Silene viscosa* Pers., *Silene viscosissima* Ten., *Lychnis viscaria* L., *Dianthus viscidus* B. Ch., *Alsine* [now *Stellaria or Cerastium*] *viscosa* Schreb., *Holosteum glutinosum* F. et M., etc., etc."

If only he had listed all the "etc." which he knew of!

"I counted sixty-four insects sticking to a single inflorescense of *Lychnis viscaria*, and even the number of different species which I have noticed on some plants of this kind is much larger than one could have believed. For instance in the immediate neighbourhood of Trins, in the Gschnitz Valley (Tirol) I collected over sixty species from the viscid flower-stems of *Silene nutans* alone. Many of these insects had certainly not visited the flowers intentionally, and may have been brought by mere accident into adherence with the sticky peduncles, having been carried there by currents of air, just as happens with the fruits of Compositae, or with grains of sand, which are so commonly to be seen adhering among the insects."

82: Thomas, P. A. 1988. The function of insect-trapping by *Penstemon digitalis* and *Cirsium discolor*. Dissertation, University of Illinois at Urbana-Champaign, Illinois, USA.

This is an excellent experimental approach to untangling the functions of stickiness in two Midwestern plants. It is a pity that most of the work was never published (and thus is difficult to find), as it is an extremely useful reference. The University of Illinois library has a scanned copy.

83: Lehmuskallio, J. *Saponaria officinalis*. http://www.luontoportti.com/suomi/images/18580.jpg accessed 26-May-2015

84: *Navarretia sinistra* in the northern coast range of California entraps large numbers of insects for such a small plant. It also hosts *Hoplinus* sp. and would be an interesting system to investigate the "siren song" in, as it has a very unique skunky odor. Photo: EFL

85: Allison Simler (pers. comm.) described this phenomenon in eupitory: "in looking at a patch of [*Ageratina adenophora*] (maybe 20 stems), it only took about a minute for me to find about 10 dead insects. Seemed to all be very small flies…. Only found them on the stems, which are the primary sticky part."

Additional likely candidates:

During my research for this, I came upon a number of genera and species which potentially entrap insects, but I could not find positive references that stated this, photos clearly showing it, and was not able to inspect any living plants myself. While not included in the list or numerical counts in the manuscript text, the taxa listed below are possibly insect-entrapping.

Dictamnus albus. (Rutaceae)

Cistus spp. (Cistaceae)

Polanisia spp. (clammyweeds: Cleomaceae)

Ledum spp. (Ericaceae)

Anticharis glandulosa; *Keckellia rothrockii* (Scropulariaceae),

Hazardia spp*., Heterotheca grandiflora*, *Perityle* spp., *Pulicaria* spp., *Rigiopappus* spp. (Asteraceae),

Camissoniopsis confusa (Onagraceae),

Ipomopsis multiflora; *Phlox viscida* (Polemoniaceae),

Collinsia tinctoria, Angelonia grandiflora (Plantaginaceae)

Aconitum spp. (Ranunculaceae)

Piriqueta spp. (Turneraceae)

Neottia (ex. *Listera*) spp. (Orchidaceae)

Caesia viscida (Xanthorrhoeaceae)

Other natural history observations:

Intraguild predation

On several occasions, I noticed dead Hoplinus and Pselliopus on the columbine peduncles. Given the ease by which they locomote over the sticky surfaces, I suspect that these were preyed upon instead of becoming entrapped. I have not observed this intraguild predation on columbines, though I have seen *Mecaphesa schlingeri*, the sticky plant crab spider, feeding on *Hoplinus* on *Hemizonia congesta* on several occasions, as pictured below (Photo: EFL).

Large carrion

On a regular basis, I find large carrion, including honeybees (*Apis mellifera*), damselflies (*Enallagma* sp.) and beetles of several families entrapped and dead. These large carrion items usually are not present at the next check, suggesting removal by a scavenger, yet all the observed arthropod scavengers in this study are sucking and leave the carcass on the plant. One possible candidate is hummingbirds; two species, Anna's (*Calypte anna*) and Rufous (*Selasphorus rufus*), which pollinate the columbine and spend much time flying amongest the plants. Though I have never observed them scavenging, they feed small arthropods to their offspring while nesting and it seems possible that they might scavenge. In non-sticky systems, I have seen harvestmen (Opiliones) scavenging insects of larger size, though I do not know if any of the California species are able exploit sticky plants.