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SUPPLEMENTARY INFORMATION

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Contents

1. Additional details on materials and methods

Plants, insects and slugs. *Solanum dulcamara* L. (Solanaceae) plants were initially collected from three different populations on lakeshores in the vicinity of Berlin (Mehrow: 52°34'06.38"N; 13°38'03.97"E, Grunewald: 52°27'44.37"N; 13°11'24.63"E and Erkner: 52°41'88.77"N; 13°77'34.09"E). To grow plants from stem cuttings, we cut shoots of 6-8 week old plants into segments with two nodes each, which were planted in 0.75 L pots with one node above and one below the soil (Einheits Erde®, type: Profi Substrat Classic, Sinntal-Jossa Germany). About 1 cm of sand (2-3 mm grain size) was filled on top of the soil to prohibit fungus gnats from ovipositing into the wet soil. Plants were grown in the greenhouse under a 16/8 h light/dark cycle and a photon irradiance between 190 and 250 µmol $m^{-2}s^{-1}$ and ample water supply. *Solanum nigrum* L. (Solanaceae) plants were grown from purchased seeds (naturasamen, Bad Kissingen, Germany) for about 6 weeks to compare the localization of the sugary secretions from *S. dulcamara* and *S. nigrum*.

Spodoptera exigua HÜBNER (Noctuidae) larvae of our culture kept in a climate chamber (24 °C, 70% r.h., 16/8 h light/dark cycle with 50% dimming for 1h) were used in two of the experiments to inflict herbivore damage on greenhouse grown *S. dulcamara*. Larvae of this

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culture were fed on a bean flour-based artificial diet (35 g agar-agar, 4 g 4-hydroxybenzoic acid methyl ester, 1 g Wesson salt mix, 1 g, L-(+)-ascorbic acid, 6 g sorbic acid, 1 g L-leucine, 64 g brewer‘s yeast, 23 g Alfalfa flour pellet, 213 g bean flour, 1 ml maize germ oil, 4 ml of 37% formaldehyde, 20 mg nicotine acid, 10 mg riboflavin, 4.7 mg thiamine, 4.7 mg pyroxidine, 4.7 mg folic acid, 0.4 mg biotin in 1.5 L water) in vented plastic boxes while the moths were kept in flight cages and were provided with 20% honey solution and with paper tissue as substrate for oviposition.

Ant nests of *Lasius niger* L., *Formica cinerea* MAYR and *Myrmica rubra* L. (all Formicidae) with at least one queen, some hundreds of workers and the surrounding soil and sand were collected on the campus of FU-Berlin and kept in plastic boxes (50x30x30 cm) painted with a 4 cm-stripe of aqueous dispersion of Polytetrafluorethylen (PTFE, Dyneon, Burgkirchen, Germany) at the top of the side walls to prevent them from escaping. Each nest contained between 200 and 500 workers and we provided a sugar/honey-water solution (5 g sucrose, 0.5 ml honey in 25 ml water) twice a week and a desert locust (*Schistocerca gregaria* FORSSKÅL), purchased from Futtertier-Shop.de, HW-Terra KG, Aurachtal, Germany) once a week.

Slugs of the *Arion vulgaris-rufus-ater*-complex (Arionidae) were collected on the campus of FU-Berlin two days before they were used in the experiment. We kept them individually in plastic cups (9 cm Ø) with punctured lids. The bottom of the cups was covered with soil and a piece of cucumber and carrot was provided as food for the first day. Next day, the food was removed and slugs were starved for 12 h before they were used in the experiment to standardize their feeding motivation. Slugs were gently cleaned from soil particles with lukewarm water then carefully dabbed with kitchen paper before they were weighted and introduced into the experimental arenas. Slugs were also starved for 2 h after the experiment before the final weight was determined after another gentle wash.

Psylliodes dulcamarae KOCH (Chrysomelidae) beetles were collected at one of the native *S. dulcamara* populations mentioned above (Erkner) using an aspirator. We kept the beetles in plastic cups (6 cm Ø) with moist filter paper in a climate chamber (24 °C, 70% r.h., 16/8 h light/dark cycle with 50% dimming for 1 h) and fed them daily with fresh *S. dulcamara* leaves. We daily examined the cups for flea beetle eggs and transferred them to separate cups on moist filter paper. Larvae hatched from the eggs after 8 days, and were used in the experiment within 24 h.

Scanning electron microscopy (SEM). *Solanum dulcamara* and *S. nigrum* were exposed to feeding by one 3rd-instar *S. exigua* larva in a clip cage overnight. We artificially wounded another set of plants with a sharp razor blade which caused low amounts of WS in *S. dulcamara* and none in *S. nigrum*. Sites of WS formation at wound edges of feeding damage and cutting wounds as well as sites of EFN secretion on the lower leaf surface of *S. nigrum* were marked in drawn sketches of the leaves to localize these positions after sample preparation.

The damage sites as well as WS secretion and EFN secretion sites of all leaves were cut out of the leaf with a sharp razor blade to receive small pieces of leaves that can be subjected to sample fixation for SEM. After fixation of the samples for 2 h in a mixture of 2% buffered osmium tetroxide (OsO4), 2.5% glutaraldehyde, and 0.1 M cacodylate, the samples were dehydrated by critical point drying (CPD 030, Balzers Union, Liechtenstein) and sputter coated (SCD 040, Balzer Union, Liechtenstein). Micrographs of the prepared samples were taken with a scanning electron microscope (Quanta 200, FEI Company, Hillsboro, USA) in high-vacuum mode.

Determination of WS sugar contents. Four WS samples, each collected with a needle from cut leaf tips of about 30 plants into 200 µl of milli-Q water, were analysed for glucose, fructose and sucrose. We used the Glucose (HK) Assay Kit (Sigma-Aldrich, St. Louis, USA)

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in 96-well plates on a Multiscan GO plate reader (Thermo Scientific, Waltham, MA, USA) according to manufacturer instructions to determine glucose according to standard solutions. First the glucose content in WS samples was examined directly and then 3 µg phosphoglucose isomerase (PGI, from yeast 128139001, Roche Diagnostics, Indianapolis, USA) were added to measure the amount of fructose. After reaching steady state, we determined the amount of sucrose by adding 0.4 mg invertase (from baker's yeast, Sigma-Aldrich, St. Louis, USA). Neither glucose nor fructose was present in WS samples. The amounts of sucrose determined in this enzymatic assay slightly exceeded (by 5.6 +/- 1.4%; mean +/- SEM) measurements of the same samples with a hand held refractometer (PCE-010, PCE Deutschland GmbH, Meschede, Germany) in % (w/w) of sucrose. The sucrose content determined in the refractometer measurements coincided with 99.7% +/- 0.01 % (mean +/- SEM) of the WS dry mass determined by weighing a portion of the same WS samples before and after drying at 60 °C for 3 days.

Sampling of WS and phloem for metabolite analysis. To induce WS, one 3rd-instar *S. exigua* larva was placed on each of three leaves, one sink leaf (first expanded leaf counted from the top), a younger (7 leaf positions down) and an older source leaf (11 leaf positions down). Phloem and WS samples were collected from the same plants and were flash frozen in liquid nitrogen and stored at -80 ^{0}C. WS were sampled 24 h after onset of feeding. The droplets were collected with a spatula and transferred into 50 µl milli-Q water. Immediately after sampling WS, the young source leaf was cut off with a sharp scalpel and phloem was collected for 24 h from the petiole in a 20 mM EDTA solution. To receive samples of approximately equal concentrations, the relative fraction of one sugar droplet was diluted with milli-Q water to a total volume of 50 µl before 120 µl MeOH was added. Because phloem samples had according to refractometer analyses about 7-fold lower sucrose concentrations than WS samples, 840 µl MeOH were added to 350 µl of phloem samples.

Metabolite analysis of WS and phloem sap. Metabolite profiling was performed by gas chromatography coupled to electron impact ionization/time-of-flight mass spectrometry (GC-EI/TOF-MS) using an Agilent 6890N24 gas chromatograph (Agilent Technologies, Böblingen, Germany) with splitless injection onto a FactorFour VF-5ms capillary column, 30 m length, 0.25 mm inner diameter, and 0.25 µm film thickness (Varian-Agilent Technologies), which was connected to a Pegasus III time-of-flight mass spectrometer (LECO Instrumente GmbH, Mönchengladbach, Germany).

The MeOH-diluted WS and phloem samples were dried completely in a vacuum concentrator and then methoxyaminated and trimethylsilylated manually prior to GC-EI/TOF-MS analysis. Retention indices were calibrated according to an n-alkane mixture (C_{10}, C_{12}, C_{15}, C_{18}, C_{19}, C_{22}, C_{28}, C_{32}, and C_{36}) that was added to each sample.

GC-EI/TOF-MS chromatograms were acquired, visually controlled, baseline corrected and exported in NetCDF file format using ChromaTOF software (Version 4.22; LECO, St. Joseph, USA). GC-MS data processing into a standardized numerical data matrix and compound identification were performed using the TagFinder software (http://www.mpimp-golm.mpg.de/10871/Supplementary_Materials). Compounds were identified by mass spectral and retention time index matching to the reference collection of the Golm metabolome database (http://gmd.mpimpgolm.mpg.de and to the mass spectra of the NIST08 database (http://www.nist.gov/srd/mslist.htm). Guidelines for manually supervised metabolite identification were the presence of at least 3 specific mass fragments per compound and a retention index deviation < 1.0%.

For relative quantification purposes, all mass features were evaluated for best specific, selective and quantitative representation of observed analytes and normalized to n-docosane. Laboratory and reagent contaminations were evaluated by non-sample controls. We verified that levels of sucrose in phloem and WS samples were in the same concentration range

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(Supplementary Fig. 1) and expressed all other metabolites assessed as percent intensity of the respective sucrose signal in a sample to normalize for variations in the samplings. Heat map visualization was performed using the multi-experiment viewer software, MeV (Version 4.9.0; http://www.tm4.org/mev).

Inducibility of WS by repetitive wounding and jasmonate. In a greenhouse experiment, we compared the amount of WS released from leaf cuts on five-week-old *S. dulcamara* control plants to that of plants that had been either repetitively wounded or treated with methyl-jasmonate (MeJA, Sigma-Aldrich, St. Louis, USA). Three leaves (the sink-source transition leaf and the two leaves below) were treated and WS harvested from these were pooled for each plant. We either wounded leaves repeatedly by applying four lines of puncture wounds in parallel to the mid-vein using a pattern wheel (one line every 15 minutes) or we applied 150 µg MeJA dissolved in 20 µl lanolin. The MeJA in lanolin was spread on the basal third of the upper leaf surface while 20 µl pure lanolin (Sigma-Aldrich, Germany) were applied to control plants. We cut off the tip of all treated leaves with a scalpel around noon, which was 15 min after the last wounding treatment and 5 h after the application of lanolin with or without MeJA. Another 6 h later, we collected WS that had formed droplets on the cutting edges. The droplets were carefully collected with a needle from all three leaves per plant, and together dissolved in 20 µl of distilled water. The amount of sucrose secreted from the three leaves of one plant was determined with a handheld refractometer as described above and normalized to the length of the cutting edge, which varied slightly between plants but did not differ between treatments.

Biotest for ant attraction by WS. We used 4 week-old *S. dulcamara* plants and defined the leaf closest to a height of 15 cm above the pot surface as central leaf. To obtain plants with WS, we exposed the adjacent leaves above and below the central leaf to feeding damage by two 3rd-instar *S. exigua* larvae in clip cages for 24 h. Undamaged control plants received

empty clip cages at the same leaf positions. We then placed one plant at a time into a box with an ant nest of *Lasius niger*, *Formica cinerea* or *Myrmica rubra*. The ant nests were not provided with food for one week prior to the experiment to ensure foraging motivation and the bottom of the plant pot was wrapped in adhesive tape to prevent ants from entering the soil. One hour after the plant was placed into the ant-box (11:00 am), we started the first of five hourly observations. At each observation, we recorded for five minutes the number of ants entering the three specified leaves and the duration of time at least one ant was present on each one of these leaves using the Observer 3.0 software (Noldus, Wageningen, the Netherlands). The averages of the five observations per plant were used for data analysis.

Field experiment with WS-mimics. We conducted a 4-week-field trial in August/September 2012 in a native *S. dulcamara* population (Erkner, see above) growing in a largely undisturbed marsh dominated by alders, grasses and ferns in the surrounding vegetation. During the 32 days of the experiment, it was mostly sunny with only a few rainy days and temperatures between 15 and 27 °C. In an area of approximately 20 x 50 m along the lakeshore, we selected 100 plants which showed no or very low herbivore damage (< 1% of the leaf area) in the upper 50 cm of the shoot. All shoots were between 50 and 120 cm long, sprouted directly from the soil and were not connected with each other aboveground. We bound the shoots to wooden sticks and marked them with a small ribbon 20 cm down from the top. The shoot above that mark was subjected to treatments and observations. The plants were assigned to one of two treatments (water droplets/WS-mimics) in an alternating order beginning with the most eastern plant and always continuing with the next closest plant to avoid position differences between the treatment groups. Every two days, we counted the number of ants present on each plant before we applied a droplet of 10 µl of either sucrose (60% w/v) to mimic WS or of pure water as a control on top of each leaf in the observed plant part. At the end of the experiment, this part had on average 13 leaves. We harvested all

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shoots, noted missing leaves and took photographs of the remaining leaves on a white board with square reference areas of 2 x 2 cm in each corner. The damaged leaf area and the total leaf area of reconstructed leaves were measured using the software UTHSCSA ImageTool (University of Texas Health Science Center San Antonio, USA, http://compdent.uthscsa.edu/dig/itdesc.html) relative to the average of the four black standard areas. When reconstructions of the leaf edges were not possible because large parts of the leaf blade (> 50%) were missing, we estimated the leaf area by calculating the mean between the leaves one position above and one position below the respective leaf. Because four plants withered during the experiment, data from 49/47 plants with water/sucrose droplets were assessed. For each plant, we deduced from the leaf damage patterns whether they had been attacked by flea beetles (all plants showed the typical small holes at least at some leaves, Supplementary Fig. 3a) and/or slugs (40% of all plants suffered on at least one leaf a contiguous damage exceeding 50% of the leaf area, Supplementary Fig. 3b). Also leaf mining larvae of *Acrolepia autumnitella* CURTIS were observed on several plants, but the effect of WS-mimics on herbivore damage was still significant when we omitted all plants hosting *A. autumnitella* (Supplementary Fig. 5a).

Greenhouse experiment testing how ants affect slug herbivory. In a 2 x 2 factorial nested block design, we exposed *S. dulcamara* plants treated with either sucrose droplets to mimic WS or water droplets to slugs of the *Arion vulgaris-rufus-ater*-complex in arenas that were either attached to an ant nest of *M. rubra* or not. Within a biological replicate (in total 11) we used weight-matched slugs, size-matched plants (Supplementary Fig. 4a and b) and the same ant nest. The slugs were matched for their body mass between the four arenas within each biological replicate, but differed between replicates ranging from 4.3 to 8.4 g of average body mass per slug. We verified the matching of plants by estimating the total leaf area of all plants based on areas of reference leaves displayed on a template. This template was produced by

copying all leaves of three plants in the same age as the experimental plants on a sheet of paper and the areas of them were measured as described for the field experiment. The area of the best fitting template leaf was assigned to each leaf of the experimental plants.

Two to three biological replicates, each consisting of four arenas representing all treatment combinations, were conducted at the same time. An arena consisted of a square plastic dishpan (40 x 40 x 30 cm) in a gaze cage (40 x 40 x 60 cm mesh width 1 mm, Vermandel Entomologie Speciaalzaak, Hulst, the Netherlands) with two *S. dulcamara* plants that were placed with pots on opposite corners. The dishpan was filled with sand (grain size 2-3 mm) covering the plant pots and with water just below the sand-surface to provide the slugs with moist conditions close to that in the field and to prevent ants from digging into the plant pots. In the two other corners, we provided halved terracotta flower pots (0.5 L) that had been soaked in water as shelter for the slugs. Two of the arenas in a biological replicate were attached to an ant nest (4 different nests were used) using PE tubes (Ø 1 cm), whereas the other two arenas were placed next to the nest without a connection. To the plants in one arena with and one without access to ants we applied sucrose droplets (40% w/v) to all leaves, whereas the plants in the remaining arenas received water droplets instead. These treatments were repeated every morning and evening, as the sucrose droplets were quickly consumed by ants and water droplets evaporated. The sucrose droplets in arenas not attached to the ant nest remained on the leaves which were therefore only tipped with a toothpick. The ant nests were connected to the arenas and the first droplet treatment was applied in the evening of the day before three slugs were added to each arena in the morning.

Every 12 h, we counted the numbers of ants present in the arenas just before new droplets were applied for 9 of the 11 biological replicates. The arenas were highly attended by the ants and we observed them to interact with slugs everywhere in the arena. As a consequence, at 11 observation points, more ants were walking in the arena as we were able to count with

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certainty (> 40) and in these cases the number was estimated. In the afternoon, two days after slugs were introduced into the arenas, the experiment was terminated and we harvested all leaves of the plants and weighted the slugs. Since several slugs died during the experiment, the change in slug body mass over the experimental time had to be calculated for each individual slug and was then averaged for each arena. In cases where it was impossible to distinguish individuals within an arena, we assigned weights in such a way as to minimize the average weight loss of all slugs within the arena. In one arena, all slugs died, resulting in a missing value for this replicate. We estimated for each leaf the percent of leaf area fed by slugs on a discrete scale of six levels (0, 20, 40, 60, 80, 100%) and calculated the absolute leaf area loss based on the total leaf area of each leaf (see above). We used the average leaf area damage over both plants in one arena for analysis. Four out of 44 arenas were not included in the data analysis because the slugs fed through the stem of a plant preventing us to assess the leaf area loss for many leaves in these arenas.

Greenhouse experiment testing how ants affect herbivory by beetle larvae. In another experiment with a 2 x 2 nested block design, we exposed plants that were either damaged by adult *P. dulcamarae* beetles or not – therefore producing WS from leaves or not – to herbivory by larvae of this flea beetle. These plants were placed in arenas and were attached to an *M. rubra* ant nest or not (but placed next to it). As described above for the experiment with slugs, we conducted biological replicates in blocks with size-matched plants (Supplementary Fig. 4c,), with four arenas of all treatment combinations and 2-3 biological replicates were set up at once.

Each arena consisted of a plastic bucket (10 L) filled up with dry sand in which a 3-week-old *S. dulcamara* plant was placed in the middle so that the pot was half dug in sand. The upper edge of the bucket was painted with a 5 cm stripe of PTFE to prevent the insects from escaping. We exposed two plants in a biological replicate to herbivory by 7 to 10 male *P.*

dulcamarae beetles that were constrained in the upper 8 cm from the shoot apex using gaze bags 15 x 10 cm, mesh width 0.3 mm) corded around the stem. The other two plants received empty bags in a similar manner. The beetles fed on the encaged leaves overnight (about 7:00 pm till 10:00 am) and induced WS. After beetles and gaze bags were removed, one damaged and one undamaged plant per biological replicate were connected to an ant nest using bridges of wooden sticks to the plant pot (3 different nests of *M. rubra* were used in total). After 10 to 30 minutes in which the ants discovered the WS and recruited nest mates, we counted every 3 minutes the number of ants present on all plants and applied a freshly hatched beetle larva to the base of the stem (1 cm above the ground). In total, we applied between 18 and 35 larvae per plant depending on their availability from the culture but for the four plants within a biological replicate their number was kept equal. In the morning of the next day, we disconnected the ant nest and removed all ants from the arenas.

The plants were kept from thereon in mosquito tents (195 x 155 x 160 cm, mesh width 1 mm) next to the greenhouse where they were exposed to the local climate conditions in South-Berlin during May and June 2014 (weather was mostly sunny with temperatures between 15 and 25 °C). Plants were constantly supplied with water and moved regularly inside the tents to avoid position effects. Two weeks later, we harvested the shoot of all plants at the node where it had emerged from the cutting that we had planted into the pot. After we had measured the stalk length, all stems and petioles were cut lengthwise and screened for beetle larvae. The complete shoots were then dried for four days at 60 °C and then weighted. In four out of 15 biological replicates one value was missing from the balanced design which is considered in the models.

Statistical analysis. Two sided test statistics were employed for all statistical tests. Unless noted otherwise, all treatments were assigned randomly either between all experimental plants or between size-matched plants within a biological replicate in a nested block-design. Mixed-

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design-ANOVA was conducted using the function "aov" in R included in the package "psych" (http://CRAN.R-project.org/package=psych). LMMs and GLMMs were calculated using the package "lme4" (http://CRAN.R-project.org/package=lme4). The *P*-values for the GLMM were calculated using the function "cftest" included in the package "multcomp" (cran.r-project.org/package=multcomp). For all linear models we used absolute data even if we presented data relative to the average of the biological replicates to depict the model results. We used common diagnostic plotting techniques to evaluate if the data met assumptions of the respective statistical analysis and if quality of models was satisfactory. These included: boxplots, qq-plots, plotting residuals vs. fitted values, estimated random intercepts vs. random intercepts, and estimated residuals vs. residuals. In case the data did not meet the requirements of the respective parametric tests, they were either transformed (i.e. Biotest for ant attraction by WS) or non-parametric alternatives were used.

2. Supplementary tables

Supplementary Table 1. Metabolites detected in WS and phloem samples. Relative intensities (normalised to sucrose, which was approximately equally concentrated (see supplementary Fig. 1), of metabolites detected in phloem and WS samples of *Solanum dulcamara* by GC-MS analysis. The number of samples in which a compound was detected (#) is marked in bolt when consistently detected in most of the phloem (n = 8) or WS (n = 13) samples respectively. Tags of unknown metabolites refer to the Golm metabolome database (http://gmd.mpimpgolm. mpg.de).

	Phloem			WS			
Metabolites	**#**	**Mean**	**SEM**	**#**	**Mean**	**SEM**	**% of phloem**
Sugars:							
Glucose	**8**	23.1	± 6.4	5	2.0	± 1.0	8
Ribose	**8**	38.0	± 5.7	3	1.4	± 1.0	4
Fructose	**8**	31.1	± 9.4	1			
Maltose	**8**	10.0	± 4.1	0			
amino acids:							
Glycine	**8**	3.9	± 0.5	**13**	2.1	± 0.5	55
Isoleucine	**8**	50.4	± 14.9	**13**	7.6	± 1.3	15
Butanoic acid, 4-amino-	**8**	49.0	± 6.9	**13**	2.7	± 0.4	6
Leucine	**8**	39.5	± 13.9	8	6.8	± 2.7	17
Valine	**8**	45.2	± 13.1	8	3.3	± 1.1	7
Threonine	**8**	25.6	± 13.2	7	3.8	± 1.4	15
Aspartic acid	**8**	52.7	± 10.7	6	3.2	± 2.1	6
Phenylalanine	**8**	55.7	± 14.2	4	6.4	± 3.5	12
Lysine	3	17.7	± 8.7	2			
Glutamic acid	3	21.4	± 14.1	0			
Pyroglutamic acid	4	19.4	± 8.4	1			
N-compounds:							
Putrescine	**8**	11.7	± 3.1	**13**	14.8	± 2.0	126
Butylamine	**7**	13.2	± 2.8	**11**	16.7	± 4.0	127
Ethanolamine	4	2.6	± 1.0	5	1.5	± 0.7	57
Iminodiacetic acid	**8**	87.6	± 3.5	1			
Acids:							
Phosphoric acid	**8**	47.8	± 5.1	**12**	7.1	± 1.7	15
Ascorbic acid	**8**	23.6	± 4.1	**12**	17.5	± 4.0	74
Lactic acid	6	12.8	± 3.7	**11**	26.0	± 7.5	203
Quinic acid	**8**	33.8	± 5.3	7	2.7	± 0.8	8
Malic acid	**8**	41.9	± 5.2	5	0.6	± 0.3	2
Fumaric acid	**8**	57.6	± 9.1	4	3.3	± 2.2	6
Glutaric acid, 2-oxo-	**8**	37.0	± 6.0	2			
Citric acid	**8**	25.6	± 5.6	1			
Glyceric acid	**8**	39.6	± 4.6	0			
Polyols:							
Myo-inositol	**8**	64.6	± 6.5	**13**	18.7	± 2.9	29
Glycerol	**8**	37.1	± 6.4	7	7.9	± 5.7	21

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Supplementary Table 1 continued

	Phloem			WS			
Metabolites	**#**	**Mean**	**SEM**	**#**	**Mean**	**SEM**	**% of phloem**
Unknown metabolites:							
A145008	**8**	46.3	± 4.6	**13**	23.7	± 3.3	51
A142016	5	9.8	± 3.5	**13**	28.6	± 5.0	290
A116014	**8**	65.0	± 8.6	**11**	3.3	± 0.9	5
A143003	**7**	18.0	± 4.5	10	15.9	± 4.8	88
A145015	6	15.0	± 3.8	10	17.5	± 4.8	116
A144007	**8**	57.1	± 11.4	8	4.2	± 2.5	7
A196005	3	4.5	± 2.8	7	7.9	± 3.1	174
A259002	2	4.6	± 3.0	7	36.4	± 12.9	795
A264005	**8**	44.2	± 10.1	5	7.5	± 4.5	17
A260006	**8**	14.1	± 3.2	5	2.4	± 1.1	17
A278013	**8**	15.1	± 2.6	5	3.0	± 1.8	20
A116012	3	8.2	± 4.0	5	4.0	± 1.8	49
A254009	**8**	37.1	± 11.6	4	3.6	± 1.7	10
A191007	**8**	37.4	± 9.1	3	4.8	± 4.6	13

Supplementary Table 2. Mixed-design ANOVAs on data from the biotest for ant attraction by wound secretions. Summary of mixed-design ANOVAs on log_{10}-transformed data on the (**a**) number and (**b**) duration (in seconds) of ant visitations on three leaves (factor leaf position) of *Solanum dulcamara* plants that were previously herbivore-damaged or not (factor treatment) on two of these leaves. Independent plants were exposed to one of three ant species (*Lasius niger*/*Formica cinerea*/*Myrmica rubra*; n = 7/6/5) which behaved consistently with regard to the treatment (n_{total} = 18). *P*-values of significant effects are signified in bold.

a - Number of ants visiting	**df**	**sum sq.**	**mean sq.**	***F***	***P***
Between subject comparisons					
Treatment (damaged/undamaged)	1	0.72	0.72	8.33	**0.007**
Ant species	2	1.07	0.53	6.14	**0.006**
Treatment x ant species	2	0.04	0.02	0.24	0.790
Residuals	30	2.60	0.09		
Within subject comparisons					
Leaf position	2	0.11	0.05	3.97	**0.024**
Treatment x leaf position	2	0.01	0.00	0.35	0.707
Ant species x leaf position	4	0.03	0.01	0.48	0.750
Treatment x ant species x leaf position	4	0.01	0.00	0.10	0.984
Residuals	60	0.81	0.01		
b - Time ants present	**df**	**sum sq.**	**mean sq.**	***F***	***P***
Between subject comparisons					
Treatment (damaged/undamaged)	1	8.89	8.89	36.88	**< 0.001**
Ant species	2	2.38	1.19	4.94	**0.014**
Treatment x ant species	2	0.33	0.16	0.68	0.517
Residuals	30	7.23	0.24		
Within subject comparisons					
Leaf position	2	2.37	1.18	17.49	**< 0.001**
Treatment x leaf position	2	1.76	0.88	13.04	**< 0.001**
Ant species x leaf position	4	0.10	0.02	0.35	0.842
Treatment x ant species x leaf position	4	0.29	0.07	1.07	0.842
Residuals	60	4.06	0.07		

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Supplementary Table 3. Linear-mixed-models testing the effect of ants on slugs. Summary of linear-mixed-models (LMM) of (**a**) change of *Arion-vulgaris-rufus-ater*-slug body mass, (**b**) consumed leaf area on *Solanum dulcamara* plants, (**c**) slug body-mass before the experiment started and (**d**) total leaf area before the experiment started. Models include the respective biological replicate (n = 11) as random factor and *Myrmica rubra* ants (presence/absence) as well as droplets (water/sucrose) as fixed factors. Full-factorial models were run first and then reduced for insignificant interactions. *P*-values of significant effects are signified in bold.

a - LMM fit by REML of change in slug body-mass (g)				
Random effects	**variance**	***SD***		
Biological replicate	0.26	0.51		
Residuals	0.26	0.51		
Fixed effects	**estimate**	***SE***	***Z***	***P***
Intercept	-0.33	0.20	-1.60	0.111
Ants (presence/absence)	-0.80	0.16	-5.12	**< 0.001**
Droplets (water/sucrose)	-0.11	0.16	-0.70	0.487
b - LMM fit by REML of leaf area consumed (cm^2)				
Random effects	**variance**	***SD***		
Biological replicate	23.00	4.80		
Residuals	35.49	5.96		
Fixed effects	**estimate**	***SE***	***Z***	***P***
Intercept	11.91	2.15	5.55	**< 0.001**
Ants (presence/absence)	-4.15	1.89	-2.19	**0.029**
Droplets (water/sucrose)	-2.81	1.93	-1.46	0.145
c - LMM fit by REML of slug body-mass before the experiment (g)				
Random effects	**variance**	***SD***		
Biological replicate	2.15	1.47		
Residuals	0.01	0.08		
Fixed effects	**estimate**	***SE***	***Z***	***P***
Intercept	6.37	0.44	14.37	**< 0.001**
Ants (presence/absence)	0.13	0.02	5.48	**< 0.001**
Droplets (water/sucrose)	-0.08	0.02	-3.24	**0.001**
d - LMM fit by REML of leaf area before the experiment (cm^2)				
Random effects	**variance**	***SD***		
Biological replicate	2651.54	51.49		
Residuals	81.95	9.05		
Fixed effects	**estimate**	***SE***	***Z***	***P***
Intercept	117.18	15.71	7.46	**< 0.001**
Ants (presence/absence)	4.70	2.73	1.72	0.09
Droplets (water/sucrose)	-2.58	2.73	-0.95	0.34

Supplementary Table 4. Statistical models testing the effect of ants on beetle larvae. Summary of a generalized-linear-mixed-model (GLMM) of (**a**) number of surviving *Psylliodes dulcamarae* beetle larvae and of linear-mixed-models (LMM) of (**b**) *Solanum dulcamara* shoot dry weight after two weeks. (**c**) LMM of plant stalk length before the experiment and (**d**) stalk growth during the experiment. Models include the respective biological replicate (n = 15) as random factor and *Myrmica rubra* ants (presence/ absence) as well as beetle-induced WS (presence/absence) as fixed factors. Full-factorial models were run first and then reduced for insignificant interactions. *P*-values of significant effects are signified in bold.

a - GLMM fit by ML for Poisson-distributed data of counted surviving larvae				
Random effects	**variance**	***SD***		
Biological replicate	0.06	0.24		
Fixed effects	**estimate**	***SE***	***Z***	***P***
Intercept	1.75	0.14	12.86	**< 0.001**
Ants (presence/absence)	-0.26	0.17	-1.49	0.137
WS (presence/absence)	0.14	0.15	0.93	0.353
Ants x WS	-0.49	0.24	-1.99	**0.047**
b - LMM fit by REML of shoot dry weight (g)				
Random effects	**variance**	***SD***		
Biological replicate	0.47	0.68		
Residuals	0.23	0.48		
Fixed effects	**estimate**	***SE***	***Z***	***P***
Intercept	2.70	0.21	12.67	**< 0.001**
Ants (presence/absence)	0.34	0.13	2.63	**0.009**
WS (presence/absence)	0.19	0.13	1.50	0.135
c - LMM fit by REML of stalk length before the experiment (cm)				
Random effects	**variance**	***SD***		
Biological replicate	46.54	6.82		
Residuals	0.37	0.61		
Fixed effects	**estimate**	***SE***	***Z***	***P***
Intercept	25.05	1.77	14.17	**< 0.001**
Ants (presence/absence)	-0.52	0.16	-3.19	**0.001**
WS (presence/absence)	-0.26	0.16	-1.57	0.117
d - LMM fit by REML of stalk growth during the experiment (cm)				
Random effects	**variance**	***SD***		
Biological replicate	104.67	10.23		
Residuals	89.23	9.45		
Fixed effects	**estimate**	***SE***	***Z***	***P***
Intercept	54.61	3.53	15.48	**< 0.001**
Ants (presence/absence)	7.07	2.55	2.77	**0.006**
WS (presence/absence)	-1.08	2.55	-0.42	0.672

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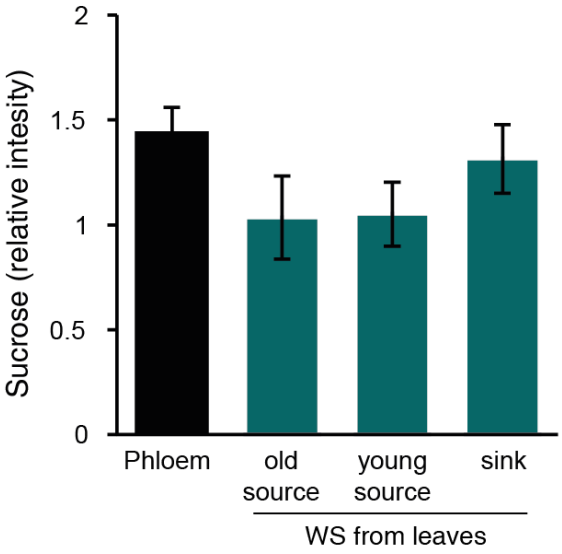
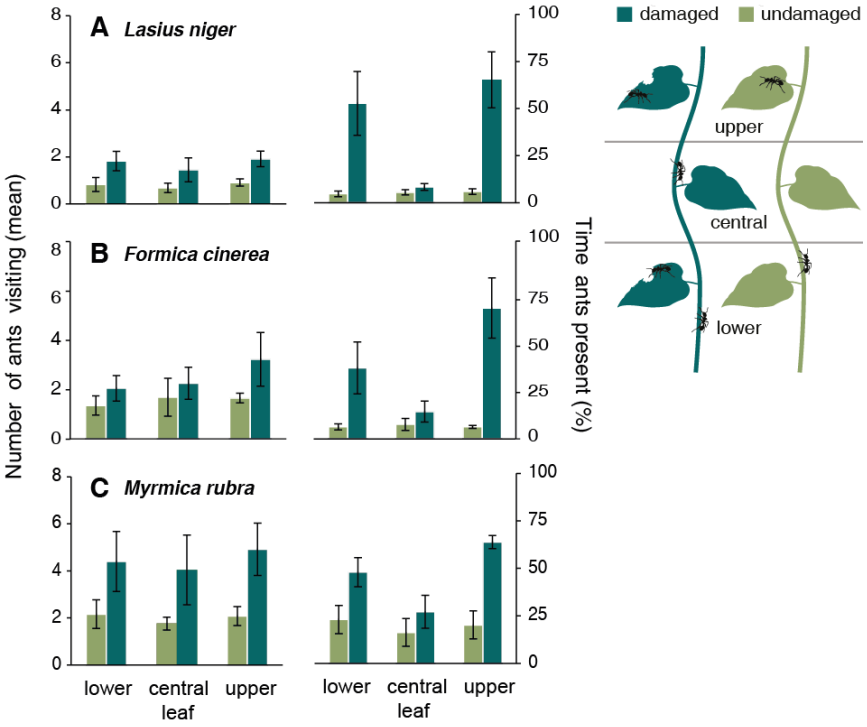
3. Supplementary figures



Supplementary Figure 1. WS and phloem sampling yielded equivalent sucrose levels. Mean +/- s.e.m. of sucrose (relative to internal standards) of phloem (black) and WS (cyan) samples to verify that samples of comparable concentrations were analysed for metabolites. Sucrose levels in phloem samples exactly matched that of WS samples collected from a sink leaf and were slightly lower in WS samples collected from source leaves of different age.



Supplementary Figure 2. Three ant species respond similar to *Solanum dulcamara* wound secretions (WS). Means +/- s.e.m. of number (left panel) and duration (right panel, in % of observation time) of ant visitations on three leaves of *S. dulcamara* plants that were previously herbivore-damaged and released WS or undamaged on the lower and the upper leaves. The central leaf was undamaged in both treatment groups. Plants were exposed to ants of either (**a**) *Lasius niger* (n = 7), (**b**) *Formica cinerea* (n = 6), or (**c**) *Myrmica rubra* (n = 5) which behaved consistently.

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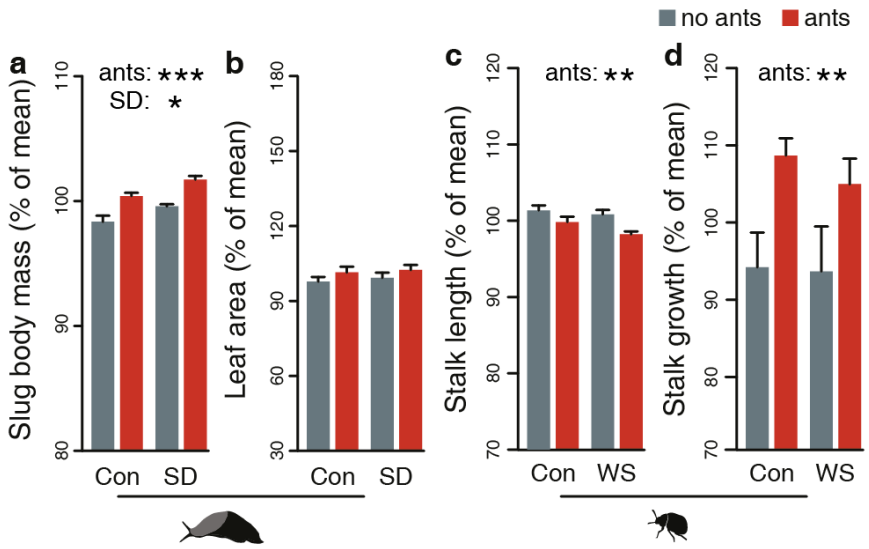
Supplementary Figure 3. Feeding patterns on plants of a native *Solanum dulcamara* population. Typical examples for (**a**) flea beetle damage consisting of a multitude of small holes scattered over the leaf and (**b**) slug herbivory characterized by expanded area loss of the leaf blade or whole leaves removed.



Supplementary Figure 4. Plants and animals in the arena experiments were size-matched. (**a**) Slug body mass and (**b**) total leaf area of plants in each treatment (sucrose droplets (SD) to mimic WS and control (Con)) before starting the slug arena experiment (n = 11). (**c**) Total stalk length of plants before starting and (**d**) the amount stalks grew during the beetle arena experiment (n = 15). Plants were either undamaged controls (Con) or produced wound secretions (WS) from leaves previously exposed to herbivory by adult *Psylliodes dulcamarae*. Bars depict means + s.e.m., are normalised to the mean of the respective biological replicate and scaled in accordance for comparison with Fig. 4. Asterisks (*/**/***) indicate significant differences at $P < 0.05/0.01/0.001$ (linear-mixed-models). To minimise bias, minute differences in plant size and slug weight within biological replicates were assigned to treatments in the most conservative way according to our working hypothesis. For example, we assigned any marginally bigger slugs, which can be expected to feed more, to arenas connected to ant nests, because our hypothesis predicted less slug-herbivory in arenas connected to ants.

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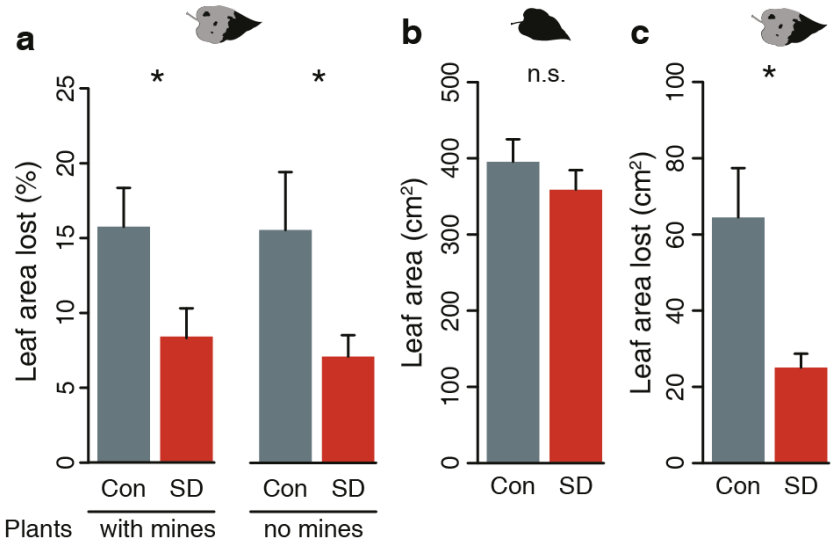

Supplementary Figure 5. Ant attendance on wild *Solanum dulcamara* reduced leaf area loss independent of herbivory by *Acrolepia autumnitella* and plant size did not differ between treatments. (**a**) Leaf area lost by *S. dulcamara* plants of a native population supplemented with sucrose droplets (SD) to mimic WS or with water for control (Con) of subsets of plants that hosted at least one leaf mining larva of *A. autumnitella* ($n_{Con/SD}$ = 22/20) or none ($n_{Con/SD}$ = 27/27). Treatment with WS-mimics reduced the leaf area lost independent of *A. autumnitella*. (**b**) The total leaf area of all experimental plants that were randomly assigned to the treatments ($n_{Con/SD}$ = 49/47) did not differ, whereas relative (Fig. 3b) and (**c**) absolute leaf area loss within four weeks was reduced on plants with WS-mimics. All bars depict means + s.e.m. and asterisks (*) indicate significant differences (Welch-*t*-tests, $P < 0.05$, n.s.: not significant).