# Supplementary Information

**Table S1.** Split-plot experimental layout of the willow field trial**.**

| Row 1 | Row 2 | Row 3 | Row 4 | Row 5 | Row 6 |
|---|---|---|---|---|---|
| **Control** | **Infested** | **Infested** | **Control** | **Infested** | **Control** |
| *S. lasiolepis* | *S. lasiolepis* | *S. matsudana* | *S. matsudana* | *S. × fragilis* | *S. × fragilis* |
| *S. matsudana* × *S. alba* (2) | *S. matsudana* × *S. alba* (2) | *S. matsudana* × *S. lasiandra* | *S. matsudana* × *S. lasiandra* | *S. × reichardtii* | *S. × reichardtii* |
| *S. viminalis* | *S. viminalis* | *S. lasiolepis* × *S. viminalis* | *S. lasiolepis* × *S. viminalis* | *S. purpurea* | *S. purpurea* |
| *S. schwerinii* | *S. schwerinii* | *S. lasiandra* | *S. lasiandra* | *S. candida* | *S. candida* |
| *S. alba* | *S. alba* | *S. eriocephala* | *S. eriocephala* | *S. matsudana* × *S. alba* (1) | *S. matsudana* × *S. alba* (1) |
| *S. matsudana* | *S. matsudana* | *S. × fragilis* | *S. × fragilis* | *S. matsudana* × *S. alba* (2) | *S. matsudana* × *S. alba* (2) |
| *S. lasiandra* | *S. lasiandra* | *S. purpurea* | *S. purpurea* | *S. viminalis* | *S. viminalis* |
| *S. matsudana* × *S. lasiandra* | *S. matsudana* × *S. lasiandra* | *S. candida* | *S. candida* | *S. lasiolepis* | *S. lasiolepis* |
| *S. eriocephala* | *S. eriocephala* | *S. × reichardtii* | *S. × reichardtii* | *S. schwerinii* | *S. schwerinii* |
| *S. lasiolepis* × *S. viminalis* | *S. lasiolepis* × *S. viminalis* | *S. matsudana* × *S. alba* (1) | *S. matsudana* × *S. alba* (1) | *S. alba* | *S. alba* |
| *S. × reichardtii* | *S. × reichardtii* | *S. lasiolepis* | *S. lasiolepis* | *S. matsudana* | *S. matsudana* |
| *S. candida* | *S. candida* | *S. matsudana* × *S. alba* (2) | *S. matsudana* × *S. alba* (2) | *S. eriocephala* | *S. eriocephala* |
| *S. purpurea* | *S. purpurea* | *S. alba* | *S. alba* | *S. lasiandra* | *S. lasiandra* |
| *S. matsudana* × *S. alba* (1) | *S. matsudana* × *S. alba* (1) | *S. schwerinii* | *S. schwerinii* | *S. matsudana* × *S. lasiandra* | *S. matsudana* × *S. lasiandra* |
| *S. × fragilis* | *S. × fragilis* | *S. viminalis* | *S. viminalis* | *S. lasiolepis* × *S. viminalis* | *S. lasiolepis* × *S. viminalis* |

Numbers (1) and (2) denote *S. matsudana* × *S. alba* (NZ 1040) and (NZ 1184), respectively.

**Table S2.** GC-MS analysis of VOCs released from the foliage of 15 willow species and hybrids, for the control and aphid-infested treatments.

| | | **Aldehyde** | **GLVs** | | | | | | **Monoterpenes** | | | | **Sesquiterpene** | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Species/hybrid** | **Treatment** | Nonanal | 1-hexanol | 2-hexenol acetate | (*E*)-2-hexenal | (*Z*)-3-hexenol | (*Z*)-3-hexenol acetate | (*Z*)-3-hexenyl-α-methylbutyrate | α-pinene | α-ocimene | (*E*)-β-ocimene | Linalool | (*E*)-α-bergamotene | (*E*) -β-caryophyllene | Copaene | δ-cadinene | α-cubebene | (*E,E*)α-farnesene | (*E, Z*)-α-farnesene |
| *S. candida* | Control | + | o | o | + | + | + | + | o | o | + | o | o | o | + | o | + | + | o |
| | Infested | + | o | o | + | + | + | o | o | o | o | o | o | o | + | o | o | o | + |
| *S. eriocephala* | Control | + | + | o | o | + | + | o | o | o | + | o | + | + | + | o | o | + | o |
| | Infested | + | o | o | o | + | + | o | o | o | + | + | o | o | o | o | o | + | + |
| *S. lasiolepis* | Control | + | o | + | + | + | + | + | o | + | + | o | + | + | + | + | + | + | o |
| | Infested | + | + | + | + | + | + | + | o | o | + | o | o | + | + | + | + | + | + |
| *S. lasiolepis* × *S. viminalis* | Control | + | o | + | + | + | + | + | o | o | + | o | o | o | o | o | o | + | o |
| | Infested | + | o | o | o | + | + | o | o | o | + | o | o | o | + | o | o | + | + |
| *S. purpurea* | Control | + | o | o | + | + | + | + | o | o | + | o | o | o | o | o | o | + | o |
| | Infested | + | o | o | o | + | + | + | o | o | + | o | o | o | o | o | o | + | + |
| *S. schwerinii* | Control | + | o | o | + | + | o | + | o | + | + | o | + | o | o | o | o | + | o |
| | Infested | + | o | o | o | + | o | + | o | o | + | o | + | o | + | o | o | + | + |
| *S. viminalis* | Control | + | o | o | o | + | + | + | + | o | + | o | + | o | o | o | o | + | + |
| | Infested | + | o | o | o | + | + | + | + | + | + | o | + | o | o | o | o | + | o |
| *S.* × *reichardtii* | Control | + | o | o | o | + | + | o | o | o | + | o | o | + | o | o | o | o | + |
| | Infested | + | o | o | o | + | + | + | o | o | o | o | o | o | o | o | o | o | + |
| *S. alba* | Control | + | o | o | o | + | + | o | o | o | + | + | o | + | o | o | o | + | + |
| | Infested | + | o | o | o | + | + | o | o | o | + | + | o | + | o | o | o | + | + |

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *S. lasiandra* | Control | + | o | o | o | + | + | + | o | o | + | o | + | + | o | o | o | + | + |
| | Infested | + | o | o | o | + | + | + | o | o | + | o | + | + | o | o | o | + | + |
| *S. matsudana* | Control | + | o | o | o | o | + | o | o | + | + | + | o | o | o | o | o | o | + |
| | Infested | + | o | o | o | o | + | o | o | + | + | o | o | o | o | o | o | o | + |
| *S. matsudana* × *S. alba* (1) | Control | + | o | o | o | + | + | o | o | + | + | o | o | + | + | + | o | o | + |
| | Infested | + | o | o | o | + | + | o | o | o | + | o | o | o | + | + | o | o | + |
| *S. matsudana* × *S. alba* (2) | Control | + | o | o | o | + | + | o | + | + | + | o | o | + | o | + | o | + | + |
| | Infested | + | o | o | o | + | + | o | + | + | + | + | o | o | o | o | o | o | + |
| *S. matsudana* × *S. lasiandra* | Control | + | o | + | o | + | + | o | + | + | + | + | + | o | o | o | o | + | + |
| | Infested | + | o | o | o | o | o | o | o | + | + | o | + | o | o | o | o | + | + |
| *S.* × *fragilis* | Control | + | o | + | o | + | + | o | + | + | + | o | + | + | o | o | o | + | + |
| | Infested | + | o | o | o | + | + | o | o | o | + | o | o | + | o | o | o | o | + |

The "o" and "+" represent absence and presence of each VOC in the headspace sample of willow species and hybrids, respectively. Numbers (1 and 2) represent two hybrids of *S. matsudana* × *S. alba* (NZ 1040 and NZ 1184).

**Table S3.** Mean emissions of total and major VOC classes as influenced by willow species/hybrid and aphid infestation.

| Species/hybrid | Infestation | VOC concentration (ng g $DW^{-1}$ $h^{-1}$) | | | | |
|---|---|---|---|---|---|---|
| | | Total | Aldehyde | GLV | Monoterpene | Sesquiterpene |
| *S. alba* | Infested | 40.98±32.19ab | 1.65±0.94 | 31.75±28.15abc | 3.23±1.72abcd | 4.35±3.04ab |
| | Control | 25.86±7.87ab | 2.91±1.53 | 17.59±4.48abcde | 3.36±1.69abcd | 2.01±1.31ab |
| *S. candida* | Infested | 31.18±8.19ab | 3.84±0.44 | 27.00±7.78abcd | 0.00±0.00f | 0.34±0.34b |
| | Control | 60.61±33.38a | 1.59±0.19 | 56.85±33.38a | 0.30±0.04de | 1.87±0.81ab |
| *S. eriocephala* | Infested | 10.28± 4.74ab | 2.37±1.58 | 5.08±1.77bcdef | 1.00±0.68abcde | 1.85±1.02ab |
| | Control | 8.03±4.43ab | 2.05±1.20 | 1.23±0.68cdef | 1.16±0.82abcde | 3.58±1.84ab |
| *S. lasiandra* | Infested | 31.77±4.32ab | 1.67±0.89 | 17.71±7.41abcde | 1.46±0.81abcde | 10.93±4.13ab |
| | Control | 25.78±17.93ab | 1.07±0.62 | 15.97±14.02abcde | 1.26±0.43abcde | 7.49±3.92ab |
| *S. lasiolepis* | Infested | 56.78±12.49a | 0.69±0.69 | 39.38±8.65ab | 0.39±0.26bcde | 16.32±6.88a |
| | Control | 66.90±8.98a | 0.44±0.25 | 55.11±12.05a | 0.90±0.65bcde | 10.45±2.57ab |
| *S. lasiolepis* × *S. viminalis* | Infested | 22.37±11.85ab | 1.71±1.04 | 17.53±11.28abcde | 0.00±0.00f | 3.14±1.58ab |
| | Control | 44.85±19.59ab | 1.49±0.67 | 42.94±20.48ab | 0.10±0.10e | 0.33±0.33b |
| *S. matsudana* | Infested | 31.90±13.03ab | 3.35±0.54 | 1.05±1.05def | 27.49±13.73a | 0.00±0.00c |
| | Control | 33.20±21.12ab | 6.87±3.49 | 0.58±0.58f | 25.74±21.89a | 0.00±0.00c |
| *S. matsudana* × *S. alba* (1) | Infested | 10.66±5.77ab | 2.00±1.06 | 2.47±1.98bcdef | 3.32±1.84abcd | 2.88±1.08ab |
| | Control | 22.65±14.20ab | 3.17±2.39 | 5.88±3.44bcdef | 9.66±6.75abc | 3.93±1.72ab |
| *S. matsudana* × *S. alba* (2) | Infested | 17.87±1.34ab | 2.17±0.81 | 9.02±3.13bcdef | 6.68±3.06abcd | 0.00±0.00c |
| | Control | 7.19±1.28abc | 1.48±0.71 | 1.94±1.15bcdef | 2.83±1.02abcd | 0.94±0.78ab |
| *S. matsudana* × *S. lasiandra* | Infested | 14.85±2.37ab | 4.20±0.98 | 0.00±0.00g | 6.39±1.90abcd | 4.25±2.16ab |
| | Control | 22.63±14.35ab | 2.22±1.11 | 2.19±2.19bcdef | 10.07±7.67ab | 8.15±6.54ab |
| *S. purpurea* | Infested | 23.97±13.84ab | 1.49±1.49 | 19.39±14.06abcde | 1.33±1.07abcde | 1.76±1.76ab |
| | Control | 54.82±7.71a | 1.87±1.48 | 50.86±8.68ab | 1.76±0.25abcde | 0.34±0.34b |
| *S. schwerinii* | Infested | 9.14±8.27ab | 1.61±0.95 | 0.86±0.86ef | 0.66±0.55bcde | 6.02±6.02ab |

| | | | | | | |
|---|---|---|---|---|---|---|
| *S. viminalis* | Control | 12.57±2.15ab | 1.88±0.27 | 3.82±1.24bcdef | 4.05±2.01abcd | 2.81±1.63ab |
| | Infested | 65.17±25.48a | 1.18±0.62 | 46.36±16.05ab | 3.88±2.29abcd | 13.76±6.88a |
| *S.* × *fragilis* | Control | 67.58±37.12a | 0.47±0.47 | 41.63±28.20ab | 6.51±3.05abcd | 18.97±9.53a |
| | Infested | 5.78±1.61abc | 1.63±0.16 | 2.65±0.79bcdef | 0.73±0.73 | 0.78±0.46ab |
| *S.* × *reichardtii* | Control | 8.59±2.72ab | 2.53±0.74 | 2.03±1.20bcdef | 2.53±1.30abcde | 1.51±0.80ab |
| | Infested | 4.06±1.80c | 0.52±0.26 | 3.54±1.56bcdef | 0.00±0.00f | 0.00±0.00c |
| | Control | 17.25±7.78 | 0.79±0.15 | 15.55±7.30abcde | 0.35±0.15cde | 0.57±0.41ab |
| $F_{14,89}$ value | | 2.55 | 1.21 | 9.46 | 19.83 | 20.02 |
| *p* value | | 0.001 | 0.261 | <0.001 | <0.001 | <0.001 |

Different letters in each row indicate statistically significant differences using Tukey' HSD test at $p < 0.05$. *Salix matsudana* × *S. alba* (1) and (2) represent two hybrids- NZ 1040 and NZ 1184, respectively.

**Table S4.** Mean emissions of selected VOCs as influenced by willow species/hybrid and aphid infestation.

| Species/hybrid | Infestation | VOC concentration (ng g $DW^{-1}$ $h^{-1}$) | | | |
|---|---|---|---|---|---|
| | | (*E*,*E*) α-farnesene | (*E*)-β-ocimene | (*Z*)-3-Hexenol | (*Z*)-3-Hexenol acetate |
| *S. alba* | Infested | 2.30±2.30ab | 8.62±4.91abcd | 4.13±4.13abcd | 27.62±24.02ab |
| | Control | 1.49±1.49ab | 9.56±4.78abcd | 2.25±1.39abcd | 15.34±4.29abc |
| *S. candida* | Infested | 0.00±0.00c | 0.00±0.00d | 8.55±1.66abc | 17.28±6.61ab |
| | Control | 0.80±0.80ab | 1.21±0.17cd | 25.82±19.80a | 27.06±10.91ab |
| *S. eriocephala* | Infested | 1.85±1.02ab | 2.12±1.09bcd | 2.80±1.18abcd | 2.27±0.79abcd |
| | Control | 2.53±1.82ab | 2.28±1.86bcd | 0.98±0.70abcd | 0.25±0.25d |
| *S. lasiandra* | Infested | 5.83±2.12a | 5.86±3.22abcd | 5.57±3.94abc | 11.26±4.63abc |
| | Control | 4.27±2.16ab | 5.03±1.70abcd | 2.51±1.09abcd | 13.07±12.60abc |
| *S. lasiolepis* | Infested | 3.78±1.83ab | 1.55±1.02bcd | 2.68±1.23abcd | 25.25±3.82ab |
| | Control | 2.97±1.30ab | 3.28±2.28bcd | 2.97±1.21abcd | 37.82±6.63a |
| *S. lasiolepis* × *S. viminalis* | Infested | 2.70±1.37ab | 0.00±0.00d | 0.80±0.44abcd | 16.72±10.92ab |
| | Control | 0.33±0.33ab | 0.40±0.40c | 3.05±1.63abcd | 37.41±17.31a |
| *S. matsudana* | Infested | 0.00±0.00c | 101.03±49.36a | 0.00±0.00e | 1.05±1.05bcd |
| | Control | 0.00±0.00c | 96.10±82.24a | 0.00±0.00e | 0.58±0.58cd |
| *S. matsudana* × *S.alba* (1) | Infested | 0.00±0.00c | 13.27±7.35abc | 0.55±0.55bcd | 1.91±1.44abcd |
| | Control | 0.00±0.00c | 33.62± 22.88ab | 0.11±0.11d | 5.77±3.45abcd |
| *S. matsudana* × *S.alba* (2) | Infested | 0.00±0.00c | 20.78±9.66abc | 0.44±0.44bcd | 8.58±3.56abc |
| | Control | 0.11±0.11b | 10.08±3.96abcd | 0.23±0.23cd | 1.7±1.18abcd |
| *S. matsudana* × *S.lasiandra* | Infested | 2.87±0.95ab | 23.28±6.79abc | 0.00±0.00e | 0.00±0.00e |
| | Control | 5.18±3.63ab | 36.34±26.74ab | 1.13±1.13abcd | 1.06±1.06bcd |
| *S. purpurea* | Infested | 1.76±1.76ab | 5.32±4.26abcd | 8.78±8.06abc | 9.78±5.25abc |
| | Control | 0.34±0.34ab | 7.04±0.98abcd | 27.54±4.31a | 16.63±3.51ab |
| *S. schwerinii* | Infested | 4.11±4.11ab | 2.63±2.20bcd | 0.52±0.52bcd | 0.00±0.00e |
| | Control | 2.33±1.23ab | 15.26±7.55abc | 1.15±0.83abcd | 0.00±0.00e |

| | | | | | |
|---|---|---|---|---|---|
| *S. viminalis* | Infested | 6.04±3.06a | 13.43±7.36abc | 12.86±3.04ab | 28.91±10.73ab |
| | Control | 8.78±5.20a | 25.00±12.47abc | 11.98±6.42ab | 26.31±19.63ab |
| *S.* × *fragilis* | Infested | 0.00±0.00c | 2.94±2.94bcd | 0.87±0.44abcd | 1.78±0.37abcd |
| | Control | 1.07±0.55ab | 9.59±4.85abcd | 0.64±0.64abcd | 1.39±0.70abcd |
| *S.* × *reichardtii* | Infested | 0.00±0.00c | 0.00±0.00d | 0.93±0.37abcd | 2.61±1.22abcd |
| | Control | 0.00±0.00c | 1.39±0.59bcd | 3.20±1.40abcd | 12.35±5.90abc |
| $F_{14,89}$ value | | 33.55 | 19.840 | 14.98 | 18.79 |
| *p* value | | <0.001 | <0.001 | <0.001 | <0.001 |

Different letters in each row indicate statistically significant differences using Tukey' HSD test at $p < 0.05$. Numbers (1) and (2) represent two hybrids of *S. matsudana* × *S. alba* -NZ 1040 and NZ 1184, respectively.

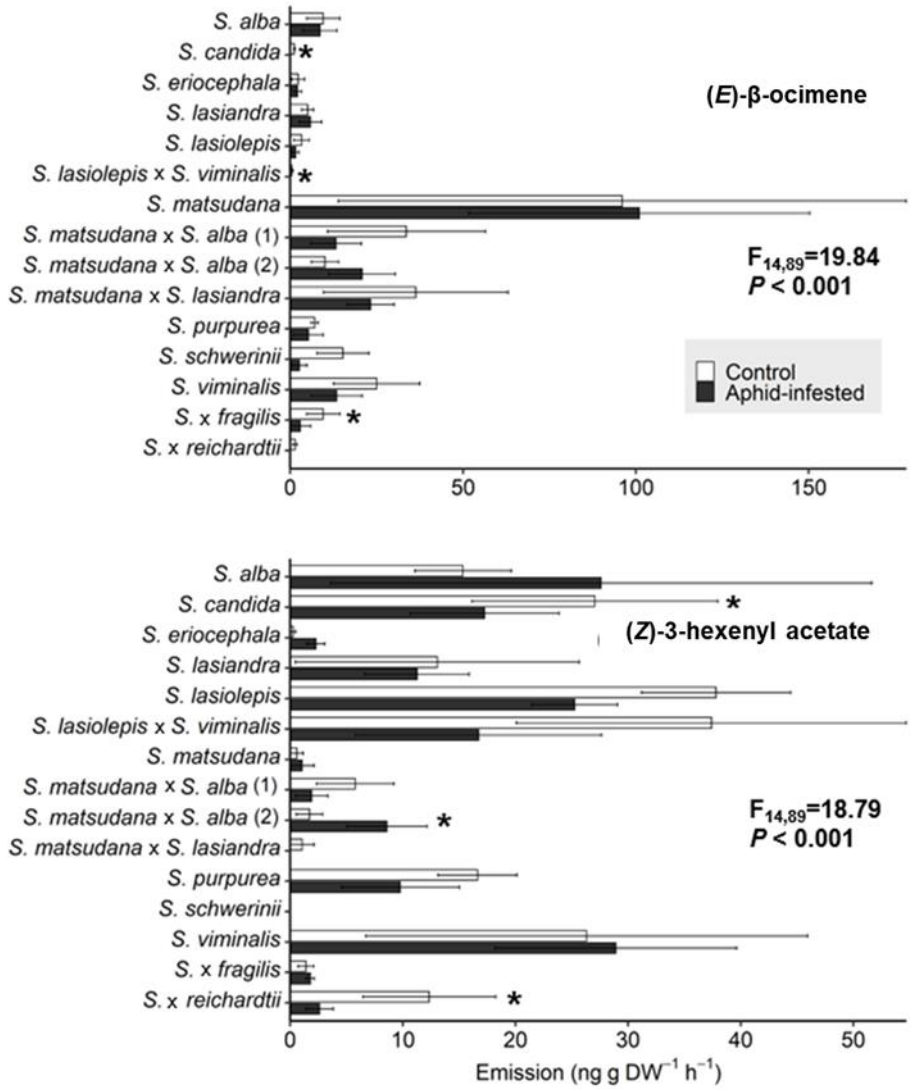


**Figure S1.** Total emissions of the terpenoid (*E*)-β-ocimene and the GLV (Z)-3-hexenyl acetate. Asterisks indicate significant differences between the treatments within each species or hybrid, Tukey's HSD test, α=0.05. Details can be seen in **Table S4**.