**Running title: Behavioral responses of a generalist pest towards leaf surface wax chemicals**

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**Behavioral responses of a generalist pest, *Spilosoma obliqua* Walker, towards the leaf surface wax chemicals of three types of jute crop and implications in pest management**

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**ESM Table 1** Plant parameters (Mean±SE, n=3) including wax chemicals in three selected host (white jute, *Corchorus capsularis*, tossa jute, C*. olitorius* and mesta jute, *Hibiscus cannabinus* [Malvaceae]) plants observed during their growing season in 2020-2021.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Leaf Parameter** | **White Jute** | **Tossa Jute** | **Mesta Jute** | **F2,6** | ***P*** |
| Leaf f wt (g leaf-1) | 1.788±0.148a | 1.948±0.148b | 1.248±0.148c | 6.141 | 0.035 |
| Leaf number | 57.333±4.631a | 52.333±4.055b | 83.000±9.539c | 6.301 | 0.034 |
| Leaf f wt (around 100g) | 101.136±0.175a | 100.739±0.393a | 100.763±0.109a | 0.756 | 0.510 |
| Wax (mg 100g-1) | 33.067±0.406a | 36.333±0.636b | 28.867±0.406c | 57.315 | <0.001 |
| Alkanes (mg 100g-1) | 20.228±0.442a | 23.279±0.626b | 17.255±0.411c | 35.951 | <0.001 |
| Free fatty acids (mg 100g-1) | 4.264±0.192a | 3.923±0.223b | 4.485±0.183c | 2.002 | 0.216 |
| Wax (μg leaf-1) | 1064.175±83.481a | 1187.578±70.683b | 728.029±34.226c | 0.243 | 0.792 |
| Alkanes (μg leaf-1) | 360.628±23.779a | 451.570±21.825b | 214.379±21.344c | 28.690 | 0.001 |
| Free fatty acids (μg leaf-1) | 75.741±3.594a | 75.766±1.763a | 55.500±4.660b | 10.868 | 0.010 |

**N**ote: Within rows means followed by same letters are not significantly different (P≥0.05) by Tukey’s HSD test.

**ESM Table 2** Adult olfactory attraction (Mean±SE, n=72) of a generalist jute pest (*Spilosoma obliqua* Walker; Arctiidae) to synthetic individual leaf surface wax chemicals (n-alkanes and FFAs in leaf equivalent amount [µg leaf-1]) of three selected (white jute, *Corchorus capsularis*, tossa jute, C*. olitorius* and mesta jute, *Hibiscus cannabinus* [Malvaceae]) plants under specified bioassay conditions having more than 70% responses.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Adult attraction conditions** | **White Jute** | | **Tossa Jute** | | **Mesta Jute** | | **F2,6** | ***P*** |
| **AI (%)** | **χ2 (df=1)** | **AI (%)** | **χ2 (df=1)** | **AI (%)** | **χ2 (df=1)** |
| **n-alkane treated filter paper vs. solvent:** | | | | | | | | |
| n-Hexadecane (n-C16) | 32.407±0.541a | 10.757 | 27.778±0.712b | 8.334 | 33.333±0.731c | 12.177 | 12.400 | 0.007 |
| n-Octadecane (n-C18) | 37.963±0.532a | 14.761 | 31.944±0.213b | 10.798 | 34.722±0.312c | 12.425 | 12.700 | 0.007 |
| n-Eicosane (n-C20) | 29.630±0.714a | 9.362 | 38.889±0.611b | 15.686 | 27.778±0.517c | 8.112 | 49.600 | <0.001 |
| n-Docosane (n-C22) | 29.630±0.832a | 10.202 | 30.556±0.513b | 10.085 | 25.000±0.451c | 7.151 | 12.400 | 0.007 |
| **Fatty acids (FAs) treated filter paper vs. solvent:** | | | | | | | | |
| Trihexadecanoin acid (C16:1) | 44.444±0.811a | 18.518 | 43.056±0.702b | 18.139 | 39.352±0.726c | 14.972 | 9.700 | 0.013 |
| Hexadecanoic acid (C16:0) | 45.833±0.602a | 18.679 | 50.000±0.426b | 21.607 | 39.352±0.902c | 13.932 | 40.300 | <0.001 |
| Octadecanoic acid (C18:0) | 44.444±0.715a | 16.703 | 44.907±0.841a | 18.143 | 40.278±0.318b | 14.758 | 9.100 | 0.015 |
| Eicosanoic acid (C20:0) | 52.778±0.541a | 22.811 | 47.222±0.651b | 19.272 | 51.852±0.562c | 22.991 | 12.400 | 0.007 |
| Docosanoic acid (C22:0) | 47.222±0.438a | 20.175 | 41.667±0.830b | 15.521 | 40.741±0.634c | 15.197 | 17.200 | 0.003 |

**N**ote: Within rows means followed by same letters are not significantly different (P≥0.05) by Tukey’s HSD test. AI=Attraction index.

**ESM Table 3** Adult olfactory attraction (Mean±SE, n=72) of a generalist jute pest (*Spilosoma obliqua* Walker; Arctiidae) to plant surface wax chemicals (n-alkanes and FFAs in leaf equivalent amount [µg leaf-1]) of three selected host (white jute, *Corchorus capsularis*, tossa jute, C*. olitorius* and mesta jute, *Hibiscus cannabinus* [Malvaceae]) plants under specified bioassay conditions.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Adult attraction conditions** | White Jute | | Tossa Jute | | | Mesta Jute | | (V) F2,6 | *P* |
| V (%) | C (%) | V (%) | | C (%) | V (%) | C (%) |
| **Alkanes treated filter paper vs. solvent:** | | | |  | | | | | |
| Total natural n-alkanes | 61.162±1.353a | 38.838±1.354 | 59.258±1.477ab | | 40.742±1.477 | 57.158±1.621b | 42.843±1.621 | 1.812 | 0.242 |
| Synthetic 4 n-alkanes mixture | 62.844±1.057a | 37.156±1.057 | 60.607±1.176ab | | 39.393±1.176 | 58.084±1.319b | 41.916±1.319 | 4.013 | 0.078 |
| **Free fatty acids (FFAs) treated filter paper vs. solvent:** | | | | | | | | | |
| Total natural FFAs | 67.125±0.736a | 32.875±0.735 | 66.142±0.775ab | | 33.858±0.775 | 64.551±0.842b | 35.449±0.842 | 2.732 | 0.143 |
| Synthetic 5 FFAs mixture | 81.390±0.712a | 18.610±0.712 | 80.644±0.753ab | | 19.356±0.753 | 79.404±0.823b | 20.596±0.823 | 1.725 | 0.256 |
| **Combined mixture treated filter paper vs. solvent:** | | | | | | | | | |
| Total natural wax | 86.540±0.594a | 13.460±0.593 | 85.791±0.634a | | 14.209±0.634 | 84.953±0.682a | 15.047±0.682 | 1.551 | 0.286 |
| Synthetic wax (4 n-alknes+5 FFAs) mixture | 89.358±0.561a | 10.642±0.562 | 89.129±0.542a | | 10.871±0.542 | 88.621±0.585a | 11.379±0.585 | 0.449 | 0.658 |
| **Combined synthetic mixture (4 n-alknes+5 FFAs) treated leaf vs. solvent:** | | | | | | | | | |
| Intact leaf | 93.302±0.466a | 6.698±0.467 | 92.802±0.519a | | 7.198±0.519 | 91.144±0.505a | 8.856±0.505 | 5.163 | 0.050 |
| De-waxed leaf | 88.379±0.501a | 11.621±0.513 | 87.628±0.537a | | 12.372±0.537 | 87.215±0.557a | 12.785±0.558 | 1.229 | 0.357 |

**N**ote: Within rows means followed by same letters are not significantly different (P≥0.05) by Tukey’s HSD test. V: Volatile and C: Control (Solvent).

**ESM Table 4** Oviposition preference (Mean±SE, n=72) of a generalist jute pest (*Spilosoma obliqua* Walker; Arctiidae) to plant surface wax chemicals (n-alkanes and FFAs in leaf equivalent amount [µg leaf-1]) of three selected host (white jute, *Corchorus capsularis*, tossa jute, C*. olitorius* and mesta jute, *Hibiscus cannabinus* [Malvaceae]) plants under specified bioassay conditions.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Oviposition conditions** | **White Jute** | | **Tossa Jute** | | **Mesta Jute** | | **(V)**  **F2,6** | ***P*** |
| **V (%)** | **C (%)** | **V (%)** | **C (%)** | **V (%)** | **C (%)** |
| **Alkanes treated filter paper vs. solvent:** | | | | | | | | |
| Total natural n-alkanes | 67.100±4.992a | 32.900±4.992 | 63.056±1.943b | 36.944±1.944 | 61.270±2.822b | 38.730±2.822 | 0.807 | 0.489 |
| Synthetic 4 n-alkanes mixture | 70.833±4.167a | 29.167±4.167 | 66.389±2.170b | 33.611±2.170 | 68.885±3.215b | 31.115±3.215 | 1.561 | 0.285 |
| **Free fatty acids (FFAs) treated filter paper vs. solvent:** | | | | | | | | |
| Total natural FFAs | 68.396±3.437a | 31.604±3.436 | 63.056±1.937b | 36.944±1.918 | 60.873±1.773c | 39.127±1.773 | 1.273 | 0.346 |
| Synthetic 5 FFAs mixture | 68.687±4.374a | 31.313±4.347 | 74.900±2.463b | 25.100±2.464 | 61.574±3.241b | 38.426±3.241 | 7.034 | 0.027 |
| **Combined mixture treated filter paper vs. solvent:** | | | | | | | | |
| Total natural wax | 71.212±3.788a | 28.788±3.788 | 69.365±1.411ab | 30.635±1.411 | 67.143±3.595b | 32.857±3.596 | 0.426 | 0.672 |
| Synthetic wax (4 n-alknes+5 FFAs) mixture | 81.990±2.625a | 18.010±2.625 | 81.297±2.282a | 18.703±2.282 | 78.939±2.038b | 21.061±2.038 | 0.472 | 0.645 |
| **Combined synthetic mixture (4 n-alknes+5 FFAs) treated leaf vs. solvent:** | | | | | | | | |
| Intact leaf | 90.139±2.045a | 9.861±2.046 | 89.153±2.066a | 10.847±2.066 | 84.583±1.816b | 15.417±1.816 | 2.243 | 0.187 |
| De-waxed leaf | 83.150±2.396a | 16.851±2.396 | 82.540±2.105a | 17.460±2.104 | 81.297±2.282a | 18.703±2.282 | 0.174 | 0.844 |

Note: Within rows means followed by same letters are not significantly different (P≥0.05) by Tukey’s HSD test. V: Volatile and C: Control (Solvent).