

Interactive comment on “Passive adsorption of neighbouring plant volatiles linked to associational susceptibility in a subarctic ecosystem” by Adedayo Mofikoya et al.

Anonymous Referee #1

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General comments

This manuscript deals with a very interesting topic in chemical ecology: it describes the passive adsorption of plant volatiles in cuticles of neighbouring plants in an subarctic ecosystem and their subsequent re-emission from them, thereby possibly influencing the occurrence of herbivorous insects.

Overall, the research topic is very timely, however, the present data set is very limited to draw a comprehensive conclusion whether absorbed and re-emitted volatiles of *Rhododendron* by mountain birch is related to associational susceptibility (AS) of mountain birch. Samples for VOC analysis were taken once in summer within a short (3 days) sampling period. I'm wondering why the sampling wasn't repeated several

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times to obtain a more comprehensive data set suitable for a more powerful statistical analysis. The limited data set at one time point lead to almost no statistical conclusions, showing AS in mountain birch induced by rhododendron VOCs (hypothesis c). The presence of a low number of insects (no data given) during the experimental period is a typical variable in field conditions, making it obligate to repeat the experiment several times to generate a sample set suitable for a comprehensive statistical analysis. The limitation in sample size also weakened the testing of hypothesis b: that high temperatures reduced the re-emission (recovery) of rhododendron VOCS from mountain birch leaf surfaces. I'm very skeptical about the correlation analysis shown in Figure 2. It's not a surprise that you get highly significant correlation coefficients when ca. half of the data set (Fig. 2a, b) show zero values. Again more data points from repeated samplings would likely give more reliable results. Scientifically I'm wondering how this negative correlation can be obtained: the y-axis in Fig 2 shows normalized (to 30°C) emission rates correlated to measured air temperature (below 22°C). Why haven't the emission rates of rhododendron VOCs from birch not been shown under ambient temperature conditions? Re-emission of VOCs from an adsorbed pool in the surface of a neighbouring plants requires in a first step the adsorption. No information is given on this process (rather than discussed). Higher temperatures most likely cause a stronger VOC emission from rhododendron, while lower temp. might favor the deposition of these VOCs in leaf surfaces. Theoretically, there should be a temperature-dependent equilibrium between deposition and re-evaporation of VOCs on plant surfaces. How does this look like? Without such an information the data in Figure 2 cannot be interpreted. Does absence of re-evaporation of VOCs from birch leaves at temperature above ca. 13°C means that all compounds were already released before the sampling period started? Since the samples were collected over 3 days it might be possible that the temperature differences during adsorption of the compounds influenced the later re-evaporation. No information is given on previous temperature and also time of the day of sampling which might have influenced the release. Overall, I think the present work shows preliminary data on a very interesting scientific topic.

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Specific comments:

Figures: the quality of the Figs 1,2 should be improved: the legends are too small to read, the lines are too thin to really follow. In Fig 1 the number of n is 24; In Fig. 2 only 18: what's the reason for that?

In the paper it's stated that the number of insects was small, how numbers are given. On the other hand this information is crucial for hypothesis b). This information must be given.

In Table 2 the information on the number of replicates is missing.

The correlation analysis in Table 3 cannot be evaluated without showing any information of the arthropod parameters (see above).

Shortening of the introduction: The introduction is very very long: It should be condensed focusing on the background of the research within the paper: e.g. 2nd last section (l. 147ff) can be omitted.

Also the discussion is very long, in relation to the data present; it can be strengthened as well.

l. 354: it must be . . . Shown by Li & Blande (2015)

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