

Reporting Summary

Nature Portfolio wishes to improve the reproducibility of the work that we publish. This form provides structure for consistency and transparency in reporting. For further information on Nature Portfolio policies, see our [Editorial Policies](#) and the [Editorial Policy Checklist](#).

Statistics

For all statistical analyses, confirm that the following items are present in the figure legend, table legend, main text, or Methods section.

n/a Confirmed

- | | | |
|-------------------------------------|-------------------------------------|--|
| ☐ | ☒ | The exact sample size (n) for each experimental group/condition, given as a discrete number and unit of measurement |
| ☐ | ☒ | A statement on whether measurements were taken from distinct samples or whether the same sample was measured repeatedly |
| ☐ | ☒ | The statistical test(s) used AND whether they are one- or two-sided
<i>Only common tests should be described solely by name; describe more complex techniques in the Methods section.</i> |
| ☒ | ☐ | A description of all covariates tested |
| ☐ | ☒ | A description of any assumptions or corrections, such as tests of normality and adjustment for multiple comparisons |
| ☐ | ☒ | A full description of the statistical parameters including central tendency (e.g. means) or other basic estimates (e.g. regression coefficient) AND variation (e.g. standard deviation) or associated estimates of uncertainty (e.g. confidence intervals) |
| ☐ | ☒ | For null hypothesis testing, the test statistic (e.g. F , t , r) with confidence intervals, effect sizes, degrees of freedom and P value noted
<i>Give P values as exact values whenever suitable.</i> |
| ☒ | ☐ | For Bayesian analysis, information on the choice of priors and Markov chain Monte Carlo settings |
| ☒ | ☐ | For hierarchical and complex designs, identification of the appropriate level for tests and full reporting of outcomes |
| ☐ | ☒ | Estimates of effect sizes (e.g. Cohen's d , Pearson's r), indicating how they were calculated |

Our web collection on [statistics for biologists](#) contains articles on many of the points above.

Software and code

Policy information about [availability of computer code](#)

Data collection Xcalibur (version 4.6), mzmine (version 4.6.0), and SIRIUS (version 6.2.2) were used to process LC-MS metabolomics data.

Data analysis R scripts used to analyze data in this study are deposited at zenodo (<https://doi.org/10.5281/zenodo.22087988>)

For manuscripts utilizing custom algorithms or software that are central to the research but not yet described in published literature, software must be made available to editors and reviewers. We strongly encourage code deposition in a community repository (e.g. GitHub). See the Nature Portfolio [guidelines for submitting code & software](#) for further information.

Data

Policy information about [availability of data](#)

All manuscripts must include a [data availability statement](#). This statement should provide the following information, where applicable:

- Accession codes, unique identifiers, or web links for publicly available datasets
- A description of any restrictions on data availability
- For clinical datasets or third party data, please ensure that the statement adheres to our [policy](#)

The mass spectrometry raw spectral data are deposited in MassIVE (MSV000102206). Other raw data, including the processed LC-MS data, are deposited at <https://doi.org/10.5281/zenodo.22087988>.

Research involving human participants, their data, or biological material

Policy information about studies with [human participants or human data](#). See also policy information about [sex, gender \(identity/presentation\), and sexual orientation](#) and [race, ethnicity and racism](#).

Reporting on sex and gender

This study does not involve human participants, their data, or biological material.

Reporting on race, ethnicity, or other socially relevant groupings

This study does not involve human participants, their data, or biological material.

Population characteristics

This study does not involve human participants, their data, or biological material.

Recruitment

This study does not involve human participants, their data, or biological material.

Ethics oversight

This study does not involve human participants, their data, or biological material.

Note that full information on the approval of the study protocol must also be provided in the manuscript.

Field-specific reporting

Please select the one below that is the best fit for your research. If you are not sure, read the appropriate sections before making your selection.

☒ Life sciences ☐ Behavioural & social sciences ☐ Ecological, evolutionary & environmental sciences

For a reference copy of the document with all sections, see [nature.com/documents/nr-reporting-summary-flat.pdf](https://www.nature.com/documents/nr-reporting-summary-flat.pdf)

Life sciences study design

All studies must disclose on these points even when the disclosure is negative.

Sample size

Eight biological replicates were used for each group during metabolomics. This exceeds a common statistical baseline of three replicates. We increased the sample size in order to obtain more statistical power considering the noisy nature of herbivore feeding.

Data exclusions

After LCMS analyses, outlier samples exhibiting exceptionally low peak intensities were identified by PCA and excluded.

Replication

The herbivore bioassays using WT plants were independently repeated twice, and both experiments produced consistent results.

Randomization

During herbivore bioassays, the plastic cage containing plants and insects were shuffled every day in their position. Plants were randomly assigned to groups.

Blinding

As plants were randomly assigned to groups and different groups were treated with different herbivores (which is visually distinguishable), blinding was not relevant in the subsequent procedures.

Reporting for specific materials, systems and methods

We require information from authors about some types of materials, experimental systems and methods used in many studies. Here, indicate whether each material, system or method listed is relevant to your study. If you are not sure if a list item applies to your research, read the appropriate section before selecting a response.

Materials & experimental systems

Methods

n/a ☒ Involved in the study

☒ ☐ Antibodies

☒ ☐ Eukaryotic cell lines

☒ ☐ Palaeontology and archaeology

☐ ☒ Animals and other organisms

☒ ☐ Clinical data

☒ ☐ Dual use research of concern

☐ ☒ Plants

n/a ☒ Involved in the study

☒ ☐ ChIP-seq

☒ ☐ Flow cytometry

☒ ☐ MRI-based neuroimaging

Animals and other research organisms

Policy information about [studies involving animals](#); [ARRIVE guidelines](#) recommended for reporting animal research, and [Sex and Gender in Research](#)

Laboratory animals

This study did not involve laboratory animals

Wild animals

Spodoptera litura larvae were purchased from the Bio Utilization Institute (Andong, Republic of Korea). The larvae were fed maize leaves at room temperature until pupation. The pupae were stored at 16°C until emergence. To induce emergence, the pupae were kept in a humid cage at 24°C under 16:8 photoperiod. The adults were housed in a cage covered with paper foil. 8% (w/v) sucrose solution was provided using cotton. Egg masses laid on the paper foil were collected every two days and stored at 16°C until hatching.

Plutella xylostella adults were kept in an acrylic cage with the cotton soaked with 8% (w/v) sucrose solution. A new parafilm cut was provided in the adult cage to collect the eggs every day. The eggs on the parafilm were stored at 4° C chamber transferred to 24 °C chamber to induce hatching. Brassica rapa spp. pekinensis leaves were provided to the hatched larvae in a plastic cage until pupation. The pupae were collected and stored at 4° C. One hundred pupae were placed in a new adult cage per a week.

Both Myzus persicae and Lipaphis pseudobrassicae were kept in the plastic cages with two B. rapa spp. pekinensis plants in the pots. Twenty unwinged adults were transferred to a new cage every week. For bioassays, newly emerged nymphs were collected in a single day and reared separately until they reach the adult stage.

Reporting on sex

Sex-based analyses were not performed as aphids are asexually reproducing in our conditions, while caterpillars are indistinguishable in sex in their larval stage during the experiment.

Field-collected samples

This study did not involve field-collected samples.

Ethics oversight

No ethical approval was required for insect colony maintenance and bioassay.

Note that full information on the approval of the study protocol must also be provided in the manuscript.

Dual use research of concern

Policy information about [dual use research of concern](#)

Hazards

Could the accidental, deliberate or reckless misuse of agents or technologies generated in the work, or the application of information presented in the manuscript, pose a threat to:

- | No | Yes |
|-------------------------------------|---|
| ☒ | ☐ Public health |
| ☒ | ☐ National security |
| ☒ | ☐ Crops and/or livestock |
| ☒ | ☐ Ecosystems |
| ☒ | ☐ Any other significant area |

Experiments of concern

Does the work involve any of these experiments of concern:

- | No | Yes |
|-------------------------------------|--|
| ☒ | ☐ Demonstrate how to render a vaccine ineffective |
| ☒ | ☐ Confer resistance to therapeutically useful antibiotics or antiviral agents |
| ☒ | ☐ Enhance the virulence of a pathogen or render a nonpathogen virulent |
| ☒ | ☐ Increase transmissibility of a pathogen |
| ☒ | ☐ Alter the host range of a pathogen |
| ☒ | ☐ Enable evasion of diagnostic/detection modalities |
| ☒ | ☐ Enable the weaponization of a biological agent or toxin |
| ☒ | ☐ Any other potentially harmful combination of experiments and agents |

Plants

Seed stocks

Seeds of Arabidopsis thaliana Col-0 and myc2/3/4 mutant were kindly provided by Dr. Chung-Mo Park, and sobir1, bak1-5, and npr1 mutants were kindly provided by Dr. Eunkyoo Oh.

Novel plant genotypes

No novel plant genotype was produced.

Authentication

T-DNA insertion was verified by PCR experiments.