Curriculum Vitae

Tobias Züst

Department of Systematic and Evolutionary Botany
University of Zürich
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University education

Sep. 2008 – Jan. 2012	**PhD** with Distinction, University of Zürich, Institute of Evolutionary Biology and Environmental Studies. *Aphids as drivers of natural selection* (advisor: Lindsay Turnbull). Date of defense: 10th February, 2012.
Sep. 2008 – Dec. 2009	**Master of Sciences**, University of Zürich, Institute of Evolutionary Biology and Environmental Studies. *Costs and benefits of resistance: size-corrected growth rate of knockout mutants* (advisor: Lindsay Turnbull)
Oct. 2005 – Jun. 2008	**Bachelor of Science in Biology**, University of Bern, *magna cum laude.* Focus on Zoology, specialisation in Population Genetics BSc Thesis: *Sequencing of the oxytocin-receptor gene in several rodent species and detection of non-neutral evolution* (advisor: Gerald Heckel)

Grants, fellowships and awards received

2021-2026	Swiss National Science Foundation Eccellenza professorial fellowship
2021-2026	European Research Council (ERC) Starting Grant
2020	Early Career Award of the International Society of Chemical Ecology (ISCE)
2016-2018	Swiss National Science Foundation Ambizione grant
2014-2015	Swiss National Science Foundation outgoing postdoctoral fellowship for advanced researchers
2012-2014	Swiss National Science Foundation outgoing postdoctoral fellowship for prospective researchers
2009-2011	Doctoral dissertation grant of the University of Zürich

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Professional experience

Feb. 2021 – present	SNSF Eccellenza professor, Department of Systematic and Evolutionary Botany, University of Zürich.

Apr. 2019 – Dec. 2020	Postdoc, project leader metabolomics in the group of Prof. Matthias Erb, Institute of Plant Sciences, University of Bern.
Nov. 2015 – Dec. 2018	SNSF Ambizione fellow, group leader at the Institute of Plant Sciences, University of Bern.
Apr. 2012 – Sep. 2015	Postdoctoral Fellow in the Department of Ecology and Evolutionary Biology, Cornell University. (Advisor: Anurag A. Agrawal)
Sep. 2007 – Mar. 2008	Independent research project on host choice of the parasitoid *Aphidius ervi* with Prof. Christine B. Müller at the Institute of Environmental Sciences, University of Zürich.

Manuscripts in review

Petschenka G., Halitschke R., Gorenflo A., Stiehler S., Tenbusch L., **Züst T.**, Hartwig C., Moreno J.F., Trusch R., Deckert J., Vilcinskas A., Exnerová A. Predation drives specialized host associations in preadapted milkweed bugs. ***bioRxiv*** https://doi.org/10.1101/2020.06.16.150730

Van Doan, C., **Züst T.**, Maurer C., Zhang X., Machado R.A.R., Mateo P., Schimmel B.C.J., Glauser G. and Robert C.A.M. Tissue-specific volatile-mediated defense regulation in maize leaves and roots. ***bioRxiv*** https://doi.org/10.1101/2020.02.21.959437

Peer-reviewed publication

Machado, R.A.R, Theepan V., Robert C.A.M., **Züst T.**, Hu L., Su Q., Schimmel B.C.J. and Erb M. (accepted) The plant metabolome guides fitness-relevant foraging decisions of a specialist herbivore. ***PLoS Biology***.

Mirzaei M., **Züst T.**, Hastings A.P., Agrawal A.A. and Jander G. (2020) Less Is More: A Mutation in the chemical defense pathway of *Erysimum cheiranthoides* (Brassicaceae) reduces total cardenolide abundance but increases resistance to insect herbivores. ***Journal of Chemical Ecology*** 46: 1131-1143.

Bont Z., **Züst T.**, Arce C., Huber M. and Erb M. (2020) Variation in root secondary metabolites is shaped by past climatic conditions. ***Journal of Ecology.*** https://doi.org/10.1111/1365-2745.13441

Züst T., Strickler S.R., Powell A.F., Mabry ME., An H., Mirzaei M., York T., Holland C.K., Kumar P., Erb M., Petschenka G., Goméz J.M., Perfectti F., Müller C., Pires J.C., Mueller L.A. and Jander G. (2020) Independent evolution of ancestral and novel defenses in a genus of toxic plants (*Erysimum*, Brassicaceae). ***eLife*** 9: e51712.

Züst T., Petschenka G., Hastings A. and Agrawal A.A. (2019) Toxicity of milkweed leaves and latex: chromatographic quantification versus biological activity of cardenolides in 16 *Asclepias* species. ***Journal of Chemical Ecology*** 45: 50-60.

Li B., Förster C., Robert C.A.M., **Züst T.**, Hu L., Machado R.A.R., Berset J.-D., Handrick V., Knauer T., Hensel G., Chen W., Kumlehn J., Yang P., Keller B., Gershenzon J., Jander G., Köllner T.G. and Erb M. (2018) Convergent evolution of a metabolic switch between aphid and caterpillar resistance in cereals. ***Science Advances*** 4: eaat6797.

Züst T., Mou S. and Agrawal A.A. (2018) What doesn't kill you makes you stronger: the burdens and benefits of toxin sequestration in a milkweed aphid. ***Functional Ecology*** 32: 1972-1981.

Johnson S.N. and **Züst T.** (2018) *Spotlight article:* Climate change and insect pests: resistance is not futile? ***Trends in Plant Science*** 23: 367-369.

Züst T., Mirzaei M. and Jander G. (2018) The genus *Erysimum* as a model system for studying cardiac glycoside biosynthesis. ***Phytochemistry Reviews*** 17: 1239-1251.

Yan J., Song Z., Xu Q., Kang L., Zhu C., Xing S., Liu W., Greimler J., **Züst T.**, Li J. and Sang T. (2017) Population transcriptomic characterization of the genetic and expression variation of a candidate progenitor of *Miscanthus* energy crops. ***Molecular Ecology*** 26: 5911-5922.

Züst T. and Agrawal A.A. (2017) Trade-offs between plant growth and defense against insect herbivory: an emerging mechanistic synthesis. ***Annual Review of Plant Biology*** 68: 513-534.

Züst T. and Agrawal A.A. (2017) Plant chemical defense as a mediator of an ant-aphid mutualism. ***Ecology*** 98: 601-607.

Züst T. and Agrawal A.A. (2016) Mechanisms and evolution of plant resistance to aphids. ***Nature Plants*** 2: 15206.

Züst T. and Agrawal A.A. (2016) Population growth and sequestration of plant toxins in a guild of four aphid species on the common milkweed *Asclepias syriaca*. ***Functional Ecology*** 30: 547-556.

Agrawal A.A., Hastings A.P., Bradburd G.S., Woods E.C., **Züst T.**, Bukovinszky T. and Harvey J.A. (2015) Evolution of plant growth and defense in a continental introduction. ***American Naturalist*** 186: E1-E15.

Züst T., Rasmann S. and Agrawal A.A. (2015) Growth-defense trade-offs for two major anti-herbivore traits of the common milkweed *Asclepias syriaca* L. ***Oikos*** *124*: 1404-1415.

Erwin A.C., **Züst T.**, Ali J. and Agrawal A.A. (2014) Aboveground herbivory facilitates above- and belowground conspecific insects and reduces fruit production. ***Journal of Ecology*** 102: 1038-1047.

Joseph B., Corwin J.A., **Züst T.**, Li B., Iravani M., Schaepman-Strub G., Turnbull L.A. and Kliebenstein D.J. (2013). Hierarchical nuclear and cytoplasmic genetic architectures for plant growth and defense within *Arabidopsis*. ***Plant Cell*** 25: 1929-1945.

Züst T., Heichinger C., Grossniklaus U., Harrington R., Kliebenstein D.J. and Turnbull L.A. (2012). Natural enemies drive geographic variation in plant defences. ***Science*** 338: 116-119. (with perspectives article by Dan Hare)

Züst T., Joseph B., Shimizu K.K., Kliebenstein D.J. and Turnbull L.A. (2011). Using knockout mutants to reveal the growth costs of defensive traits. ***Proceedings of the Royal Society B*** 278: 2598-2603.

Paul-Victor C., **Züst T.**, Rees M., Kliebenstein D.J. and Turnbull L.A. (2010). A new method for measuring relative growth rate can uncover the costs of defensive compounds in *Arabidopsis thaliana*. ***New Phytologist*** 187: 1102-1111.

Züst T., Härri S.A. and Müller C.B. (2007). Endophytic fungi decrease available resources for the aphid *Rhopalosiphum padi* and impair their ability to induce defences against predators. ***Ecological Entomology*** 33: 80-85.

Supervised students

Jun. 2018 – Aug. 2018	Galen Tiong, University of Bern/Brown University. *Sequestration of plant defenses by the mustard aphid Lipaphis erysimi on a cardenolide-producing crucifer*. Brown University LINK award for summer internships.
Apr. 2017 – Aug. 2017	Cedric Zahnd, University of Bern: *Effects of nitrogen fertilization, fungicide application and plant diversity on the performance of aphids in the field.* Bachelor's thesis in Biology.
Aug. 2016 – Sep. 2016	Cedric Zahnd, University of Bern: *Effects of dandelion secondary metabolites on an ant-aphid interaction.* Research practical in plant sciences.
Sep. 2014 – May. 2015	Sophie Mou, Cornell University: *Sequestration of host plant toxins by the aphid Aphis nerii under predator pressure.* Honor's thesis in Biology, awarded *summa cum laude.*

Thesis committees & examinations

Jun. 2021	Abdel Boubakri, Institute of Plant Sciences, University of Bern, Switzerland.
Oct. 2020	Carolina Osuna Mascaró, Departemento de Genetica & Research Unit Modelling Nature, Universidad de Granada, Spain.
Feb. 2019	Jorad de Vries, Laboratory of Entomology, Department of Plant Sciences, Wageningen University, The Netherlands.

Invited Seminars

Oct. 2019	Institute of Biology, University of Neuchâtel, Switzerland.
Feb. 2019	Laboratory of Entomology, Department of Plant Sciences, Wageningen University, The Netherlands.
Jan. 2019	Institute of Vegetation Science, University of Hohenheim, Germany.
Oct. 2018	Institute of Terrestrial Ecology, Technische Universität München, Germany.
Jun. 2018	Institute of Insect Biotechnology, University of Giessen, Germany.
May 2018	Department of Ecology and Evolution, University of Lausanne, Switzerland.
Mar. 2018	Department of Systematic and Evolutionary Botany, University of Zürich, Switzerland.
Nov. 2017	Department of Chemical Ecology, University of Bielefeld, Germany.
Mar. 2017	Department of Entomology, Texas A&M University, USA.
Jan. 2016	Molecular Evolutionary Biology, University of Hamburg, Germany.
Apr. 2015	Department of Entomology, Penn State University, USA.
Dec. 2013	Institute of Evolutionary Biology and Environmental Studies, University of Zürich, Switzerland.
Aug. 2010	Department of Biological Sciences, Boise State University, Idaho, USA.

Presentations at conferences (last 5 years)

Dec. 2018	Annual Meeting of the British Ecological Society (talk)

Jul. 2017	16th Symposium on Insect-Plant Interactions (SIP), Tours, France (talk).
Mar. 2017	Symposium of the Life Science Zürich Graduate School, University of Zürich, Switzerland (keynote).
Feb. 2017	13th Gordon Research Conference on Plant-Herbivore Interactions (poster presentation).
Jan. 2017	SwissPlant 2017, Leukerbad, Switzerland (talk).
Aug. 2015	100th Annual Meeting of the Ecological Society of America (talk).
Dec. 2014	Hemiptera Day 2014, Cornell University, USA (keynote talk).
Aug. 2014	Symposium on Insect-Plant Interactions (SIP), Neuchâtel, Switzerland (talk).
Feb. 2013	12th Gordon Research Conference on Plant-Herbivore Interactions (poster presentation).

Services

Since 2018	Associate Editor for *Journal of Ecology*.
Since 2010	Reviewer for *American Journal of Botany*, *American Naturalist*, *Annals of Botany*, *Arthropod-Plant Interactions*, *Ecological Entomology*, *Ecology*, *Ecology and Evolution*, *Ecology Letters*, *Ecosphere*, *Evolutionary Ecology*, *Frontiers in Plant Science*, *Functional Ecology*, *Journal of Animal Ecology*, *Journal of Ecology*, *Journal of Plant Ecology*, *Landscape Ecology*, *Molecular Ecology*, *Peer J*, *Plant Cell*, *PLoS One*, *Proceedings of the Royal Society B*, *Trends in Plant Sciences*.
2018	Reviewer for the Estonian Research Council
2018	Reviewer for the French National Research Agency (ANR).
2016, 2018	Reviewer for the Netherlands Organisation for Scientific Research (NWO).
2014, 2015, 2017	Reviewer for the United States of America National Science Foundation (NSF).
Dec. 2009 – Apr. 2011	Member of the Web-Commission of the Institute of Evolutionary Biology and Environmental Studies.
Dec. 2009 – Apr. 2011	Graduate Student representative in the assembly of the Institute of Evolutionary Biology and Environmental Studies.
Nov. 2004 – Apr. 2005	Military service.

Society Memberships

International Society of Chemical Ecology, Ecological Society of America, British Ecological Society