

## Press Release

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### HOW DO WE MAKE PLANTS AS CLIMATE RESISTANT AS CAMELINA?

AIT expert Claudia Jonak wants to create solutions for agriculture with UNTWIST.

**The native oil plant Camelina (gold of pleasure) is remarkably robust to heat and drought, traits that are more important today than ever before. AIT expert Claudia Jonak (Center for Health and Bioresources) is exploring the plant's secret in the H2020 project to learn from it to help European agriculture meet the challenges of climate change.**

Currently, an unusual drought extends to large parts of Europe, the impact can be seen everywhere, and agriculture in particular is suffering. Crops are often optimized by breeding for yield under good growing conditions and have little to counter the increasing challenges of weather extremes, such as prolonged heat and drought, resulting in significant crop losses. Possible solutions can be provided by gold of pleasure (Camelina sativa), a native traditional crop. Not only is gold-of-pleasure oil particularly healthy because it is rich in omega-3 fatty acids, but the plant also has a naturally high tolerance to heat and drought. Gold of pleasure is very adaptable, able to grow in many different places and adapt to difficult environmental conditions. Camelina has been known in agriculture since ancient times, but did not undergo intensive breeding and was almost forgotten at the beginning of the last century. However, therein lies its great potential for the future, as the natural mechanisms of stress tolerance are still preserved. The project UNTWIST wants to learn from this oil plant how a successful adaptation to drought and heat is also possible for other crops and thus to ensure the yield security of agriculture in the future.

#### Project UNTWIST - how we learn from gold of pleasure for agriculture

The Horizon 2020 project UNTWIST has been running since September 2020 under the leadership of AIT expert Claudia Jonak and her team from the Competence Unit Bioresources of the Center for Health & Bioresources and is funded with almost 5 Mio. 5 million from the European Union to decipher the mechanisms of heat and drought tolerance of the climate-resistant gold-of-pleasure: *"On the one hand, our goal is to make gold-of-pleasure better known and to exploit its potential; on the other hand, we want to use the adaptation mechanisms of gold-of-pleasure to make other crops fit for the challenges of climate change and to ensure their yield even under adverse environmental conditions,"* explains AIT expert Claudia Jonak and her team from the Competence Unit Bioresources of the Center for Health & Bioresources.

*We have started with a collection of more than 50 gold-of-pleasure lines from different geographical origins, including landraces as well as commercial cultivars and breeding lines. These Camelina lines are cultivated and analyzed in field trials in different countries in Europe, as well as under controlled heat and drought stress conditions.*" Here, agriculturally important characteristics of the plant, such as time of flowering, yield and quality of harvest, were recorded and compared. Furthermore, the genomes of these lines were sequenced and the adaptation of metabolism to heat and drought periods was investigated. Based on these data, the four most promising lines were selected for further detailed analysis. These now have to prove themselves under controlled stress conditions in the glasshouse as well as in the open field. Using integrative "omics" approaches, the reactions of metabolism, cell physiology and gene and protein expression to heat and drought are analyzed and correlated with agronomically relevant parameters such as yield and crop quality. Among others, the AIT Bioresources group brings its years of expertise in plant stress physiology, molecular biology and biochemistry to the project and works closely with seven European project partners with complementary expertise: Institut National de Recherche pour l'Agriculture, l'Alimentation et l'Environnement (INRAe), Rothamsted Research Limited (RRes), Forschungszentrum Jülich GmbH (FZJ), University of Bologna (UNIBO), Camelina Company Espana S.L. (CCE), Iniciativas Innovadoras SAL (INI), RTDS - Association for the Promotion of Communication and Mediation of Research, Technology and Innovation.

### „Plant Adaptation Hub“ Database

Based on the multi-layered, mechanistic and agricultural data, new molecular and metabolic markers can be developed for breeding stress-tolerant plants. They also provide the basis for building complex computer-based predictive models to make predictions for crop adaptability. The results and models will be made available to stakeholders in a web-based "Plant Adaptation Hub" database to enable effective translation of research findings into practice. Jonak concludes, *"The newly acquired knowledge about the metabolic, physiological, molecular and genetic factors that make up stress tolerance in gold-of-pleasure will be made available in a user-friendly web database. Researchers, breeders, seed companies and farmers can thus use this knowledge, develop it further and apply it in other crops. But I also hope that this project will help to make gold of pleasure better known again."*

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Link project: <https://www.untwist.eu/>

Link project video: <https://www.youtube.com/watch?v=WyKesb6NTA4>

More information about the center: <https://www.ait.ac.at/bioresources>

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