INNOVATION NETWORK TO IMPROVE SOYBEAN PRODUCTION UNDER GLOBAL CHANGE

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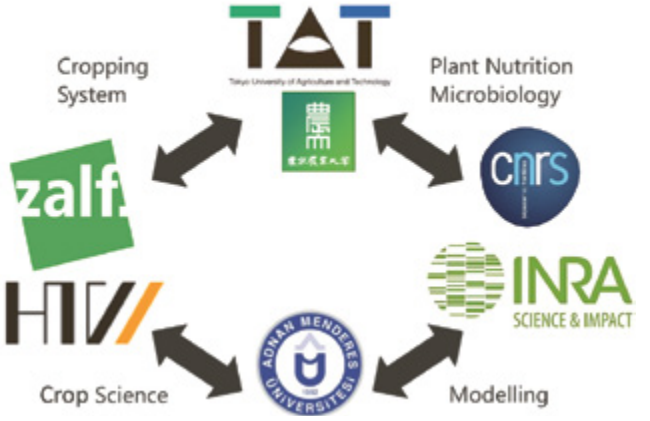
Experts from Japan, France and Germany inspect soybean plants on a farm field in Brandenburg, Germany, during the kick-off-meeting on July 27 and 28, 2017.

Soybeans are an important source of protein for food and feed due to their high protein content and the high quality of the amino acid content. The symbiotic nitrogen fixation (SNF) of the rhizobium bacteria living in symbiosis with the soybean roots contributes 60–80 % of the total plant nitrogen uptake and is thus one of the most important factors influencing the nitrogen supply of the soybean plant. The SNF activity is the result of multiple symbiotic interactions among the soybean cultivar, the strain of rhizobium, environmental conditions and crop management. SNF is the key to a successful cultivation of soybeans.

The establishment of a stable SNF in soybean is subject to globally diverse, site-specific challenges. In Japan, high levels of precipitation lead to oxygen deficiency and inhibited root growth on loamy soils. In contrast, water shortage is the biggest limitation for soybean cultivation in parts of Europe. While sulfur deficiency becomes more and more common in European soils, the volcanic soils of Japan feature high amounts of natural sulfur. Nitrogenase, the main enzyme of the SNF, is especially sensitive with respect to sulfur deficiency. Sulfur availability in soils is therefore of major importance for a sustainable soybean cultivation.

It is the objective of this international project supported by the »European Interest Group CONCERT-Japan« to create an innovative network linking soybean research in Japan, Germany, Turkey and France. The network particularly aims to clarify the impact of different environmental factors, especially water and sulfur supply, on the SNF and soybean yield, and to calibrate and test dynamic models for the prediction of soybean growth under different soil and environmental conditions. The project consists of three interlinked work packages: 1) analysis of soybean growth, 2) investigation of SNF under different environmental conditions, and 3) modelling of soybean growth based on a dynamic crop growth model.

Innovative soybean cropping methods will be developed based on the combination of results from field and pot experiments with site-specific modelling of soybean growth at various locations globally. Project results will contribute to the establishment of sustainable soybean cultivation under the challenge of global change.



Partners of the INNISOY Research Network

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