Tropentag, September 18-21, 2016, Vienna, Austria

"Solidarity in a competing world — fair use of resources"

Biotechnological Improvement of the Biofuel Crop *Jatropha curcas*

Fatemeh Maghuly, Margit Laimer

University of Natural Resources and Life Sciences (BOKU), Dept. Biotechnology, Austria

Abstract

To counteract effects of climate change requires concerted actions to deliver further benefits to reduce both air pollution and greenhouse gas emissions, including the use of alternative fuels and biofuel crops. *Jatropha curcas* (Euphorbiaceae) is currently attracting much attention as a new energy crop, as it can grow in tropical and subtropical climates, under climate and soil conditions that are unsuitable for food production. However, Jatropha has not really been domesticated; most of the Jatropha accessions are toxic, which renders the seedcake unsuitable for use as animal feed. The seeds of Jatropha contain high levels of polyunsaturated fatty acids, which negatively affect the biofuel quality. Fruiting of *Jatropha* is continuous, thus increasing costs of harvesting. Therefore, before starting any improvement program using conventional or molecular breeding techniques, understanding gene function and the genome scale of Jatropha are prerequisites.

Access to the domestication of *Jatropha* requires a holistic approach, in order to retain valuable genetic resources. Developing *Jatropha* cultivars for a wide variety of applications (e.g. biofuel production, reforestation, medical applications, soap production) and with a number of special features (growth form, high yield, adaptation to different climatic conditions, high oil content, lower toxin levels, reduced allergenicity and pathogen resistance) will allow for an economic use of the plant. To make an informed selection of plant material and to assign functions to selected gene products, a deep understanding of the physiology of Jatropha for practical applications is required. Therefore, data will be presented from our experiments with high-throughput technologies for gene annotation, e.g. WGS, GBS, ddGBS, oligonucleotide microarrays, and functional genomics analysis of economic traits such as oil and toxin biosynthesis.

If carefully managed under conditions observing sustainable practices, the planting of *J. curcas* can be considered as an effective option for rehabilitating wastelands and improving employment opportunities and livelihood in rural area.

Keywords: Biofuel, energy crop, functional genomics, Jatropha

Contact Address: Margit Laimer, University of Natural Resources and Life Sciences (BOKU), Dept. Biotechnology, Muthgasse 18, 1190 Vienna, Austria, e-mail: margit.laimer@boku.ac.at