NOMAD Bioscience Published Milestone Paper in Nature Plants Describing its RNA-Based Rapid Transient Reprogramming of Crop Plants for Agronomic Performance

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NOMAD Bioscience announces the publication in Nature Plants (Torti et al. (2021) Nature Plants 7; https://www.nature.com/articles/s41477-021-00851-y) a research paper describing NOMAD's novel transient RNA replicon-based process of controlling agronomic performance of crop plants. The process does not involve genetic modification of the plant genome and is thus limited to a single plant generation, is broadly applicable, fast, tuneable, versatile, and can be used throughout much of the crop cultivation cycle. This alternative technology transiently targets various regulatory circuits within a plant, leading to operator-specified alterations of agronomic traits, such as time of flowering, vernalization requirement, plant height, drought tolerance, and many others. To use it on an industrial level, the authors redesigned techniques of gene delivery, amplification and expression around viral transfection methods that can be implemented on an industrial scale and with multiple crop plants. Preferred solution is based on spraying plants with packaged RNA vectors thus eliminating DNA release into environment or its introduction into plants altogether. The results, published in Nature Plants, a Nature group journal, amply illustrate cases of manipulation of agronomic traits based on RNA transient expression or silencing of specific plant regulatory genes - components of hormonal circuits, such as flowering control, gibberellin, abscisic acid, ethylene pathways and others. Transient technology of gene expression has already been industrialized in the area of production of biologics, vaccines and diagnostics for medicine. In those industrial applications, however, only one plant is being used as an industrial host for manufacturing recombinant proteins (*Nicotiana benthamiana)*, and the process relies on *Agrobacterium*-mediated DNA transfer for transient transfection.

"The transient agronomic technology we pioneered holds a very high promise, particularly because of speed and low cost of its deployment", said Prof. Yuri Gleba, NOMAD's CEO. "We expect that the technology will gain regulatory approval and commercial recognition initially in certain niche areas, before garnering attention for mainstream application on large-acreage major crops. One such application area is the production of commercial seed, where production can be made simpler and more efficient through acceleration of flowering time or transient control of male sterility. The other would be a more rapid deployment of orphan crops (millet, amaranth, buckwheat, cowpea, marihuana, etc.) for flowering control, drought tolerance, product quality improvement and such. Current swift approval and adoption of RNA-based viral vaccines for human health tells us that, because of its inherent speed and efficacy, the acceptance of RNA transfection-based agriculture, too, is likely to be accelerated during forthcoming and unavoidable major plant pathogen outbreaks."

About NOMAD Bioscience GmbH. NOMAD Bioscience GmbH is a plant biotechnology company developing a broad range of biotechnology products manufactured in plants.

Among the product candidates in development are antiviral biologics, non-antibiotic antimicrobials (bacterial bacteriocins and phage endolysins) for food safety and medicine markets, as well as natural proteins thaumatins as taste modifiers or high intensity non-caloric sweeteners. Corporate offices are headquartered in Munich, Germany and the Company's Research Division is located in Halle, Germany. NOMAD Bioscience GmbH has also a wholly owned subsidiary UAB Nomads (Vilnius, Lithuania).

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