

# AMF in Agriculture – Challenges and Opportunities

Reichelt W.N.<sup>1</sup>, Brillmann M.<sup>1</sup>,

<sup>1</sup> Evologic Technologies GmbH; Austria

## ABSTRACT

The potential of arbuscular mycorrhizal fungi (AMF) as biostimulant in agriculture has been widely analyzed and discussed in literature. Summarizing AMF is being regarded as one of the most promising biostimulants in the field. Despite the substantial amount of evidence for the benefits AMF in agriculture, the adoption of AMF as standard instrument for crop yield increase is relatively low compared to the potential.

Apparently the end user of AMF products is not yet convinced that the reproducibly added value of using AMF in agriculture is in a lucrative ratio to the current selling price. He simply doesn't want to take the risk of wasting money. This is not surprising giving the wide range of available AMF products and the great variance in product quality. In addition, also the price range of AMF products is vast. Due the lack of transparent and uniformly defined quality criteria, the evaluation of the price/performance ratio is challenging, even for scientists. Accordingly, the main degrees of freedom to catalyze AMF adoption as biostimulant are product quality and cost of production.

To improve the price/performance ratio in the eyes of the customer the price must be lowered and the performance ensured. From a manufacturers perspective these two variables are mainly impacted by the route of production as well as by the method of product analysis and the correlated reproducibility. Current AMF production approaches can achieve high volumetric productivities but can hardly tap the economy of scale. In order to make AMF production scalable to several m<sup>3</sup> of production volume, the handling of the root organ culture must be largely automated but remains challenging up to this date. In order to improve on the product performance, high quality standards have to be met and maintained. Applying quality by design principles, product quality has to be considered as soon as during process development in the lab scale. Therefore, the laborious and error prone state of the art analysis methods have to be improved by transferring state of the art technologies e.g. automated image analysis algorithms to AMF analytics. In combination, the improvement on analytical capabilities and lowering the cost of production the usage of AMF in agriculture will be greatly facilitated since the risk for the end user is minimized.