



**BAYBURT  
ÜNİVERSİTESİ**

**I. ULUSLARARASI  
ORGANİK TARIM VE  
BİYOÇEŞİTLİLİK**

# SEMPOZYUMU VE ÇALIŞTAYI



**otbiyosem**

27-29 Eylül - September 2017

Bayburt / TURKEY

## BİLDİRİ KİTABI

**BAYBURT UNIVERSITY  
1<sup>ST</sup> INTERNATIONAL  
ORGANIC AGRICULTURE  
AND BIODIVERSITY**

# SYMPOSIUM AND WORKSHOP

## **Plant Growth Promoting Rhizobacteria as Alleviators for Soil Degradation**

Metin TURAN<sup>1</sup> Nurgül KITİR<sup>2</sup> Adem GÜNEŞ<sup>3</sup> M.Rüştü KARAMAN Ertan YILDIRIM<sup>4</sup>

### **Abstract**

The long-term development of global socio-economic systems requires the sustainable use of natural resources. The sustainable use of soil resources depends on three factors: soil characteristics, environmental conditions, and land use. These factors interact on systems-based principles, where the change in one factor causes alteration in the others. Therefore, the sustainable use of soil resources is a dynamic category. It is important to assess our soil resources from this standpoint and consider soil as the prime object of sustainable use in relation to land management under given natural conditions. This approach needs to be an integral part of land-use planning and decision making on different levels, ranging from the local to world scales. Land improvement is an increase in productivity change that reflects both natural- and human-induced processes of degradation and improvement. Land degradation can be considered in terms of the loss of actual or potential productivity or utility as a result of natural- or human-induced processes acting upon the land; it is the decline in land quality or reduction in its productivity. In the context of productivity, land degradation results from a mismatch between land quality and land use. Mechanisms that initiate land degradation include physical, chemical, and biological processes. Important among physical processes are a decline in soil structure leading to crusting, compaction, erosion, desertification, anaerobism, environmental pollution, and unsustainable use of natural resources. Significant chemical processes include acidification, leaching, salination, decrease in cation retention capacity, and fertility depletion. Biological processes include reduction in total and biomass carbon and decline in land biodiversity. The latter comprises important concerns related to eutrophication of surface water, contamination of groundwater, and emissions of trace gases (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, and NO<sub>x</sub>) from terrestrial/aquatic ecosystems to the atmosphere. Soil structure is the important property that affects all three degradation processes. Thus, land degradation is a biophysical process driven by socioeconomic and political causes. Farmland degradation can also have important negative effects of the farm, including deposition of eroded soil in streams or behind dams, contamination of drinking water by agrochemicals, and loss of habitat. Existing estimates of the current global extent and severity of the problem should be considered indicative at best. The Global Land Assessment of Degradation (GLASOD), based only on the impressions of experts, estimates that nearly two billion ha worldwide (22% of all cropland, pasture, forest, and woodland) have been degraded since mid-century.

Around 3.5% of the two billion totals are estimated to have been degraded so severely that the degradation is reversible only through costly engineering measures, if at all. Just over 10% has been moderately degraded, and this degradation is reversible only through major on-farm investments. Of the nearly 1.5 billion ha in cropland worldwide, about 38% is degraded to some degree. Various sources suggest that 5–10 million ha are being lost annually due to severe land degradation. If this trend continues, 1.4–2.8% of total cropland, pasture, and forest land will be lost by 2020. Declining yields (or increasing input requirements to maintain yields) could be expected over a much larger area. These data are, however, likely to overestimate the problem, as they do not account for the effects of land improvements, which also appear to be widespread.

<sup>1</sup> Department of Genetic and Bioengineering, Faculty of Engineering and Architecture, Yeditepe University, Istanbul, Turkey

<sup>2</sup> Erciyes University, Faculty of Agriculture, department of Soil Science, Kayseri

<sup>3</sup> Afyon Kocatepe University, Department of Medical and Aromatic Plants, Afyon

<sup>4</sup> Atatürk University, Faculty of Agriculture, department of Horticulture, Erzurum

*"1<sup>st</sup> International Organic Agriculture and Biodiversity Symposium 27-29 September 2017 Bayburt"*

*"1. Uluslararası Organik Tarım ve Biyoçeşitlilik Sempozyumu 27-29 Eylül Bayburt"*

**Keywords:** Plant Growth Promoting Rhizobacteria, Soil degradation, Sustainable agriculturd, organic agriculture