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***Parthenium* Phyllody in Ethiopia: Epidemiology and Host Range of Phytoplasmas within Important Crops Cultivated in Ethiopia**

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Abstract

Parthenium hysterophorus is an annual weed originating from Central America. It was introduced to Ethiopia in the 1980ies and became the major invasive weed in both arable and grazing lands, due to its competitiveness and adaptability to different climates and soils. In Ethiopia a disease caused by phytoplasmas was commonly observed in *Parthenium* (up to 75 % field incidence). Diseased plants are characterised by excessive branching (witches' broom), reduced plant height and leaf size, and modification of floral structures into leaf-like structures that lead to sterility (phyllody).

More than 700 plant diseases are associated with phytoplasmas. In order to test whether *Parthenium* plants harbor phytoplasmas, which may also infect important agricultural crops in Ethiopia, weeds and cultivated plants showing phyllody symptoms were collected. Furthermore, planthoppers that are supposed to serve as potential vector insects were captured from phyllody diseased *Parthenium* plants and transmission studies were carried out by use of leafhoppers. Phytoplasma infection was assessed by polymerase chain reaction (PCR) and the PCR products were further characterised by sequencing allowing species identification of the pathogens.

DNA fragments specific for phytoplasmas could be detected in *P. hysterophorus* as well as in important crops in Ethiopia, e.g. groundnut, sesame, and grass pea. The phytoplasmas belong to the Peanut witches' broom (16 SrII) group and can be transmitted by the leafhoppers *Orosius cellulosus* native to Ethiopia. Moreover, it could be shown that nymphs as well as adult planthoppers of the genus *Hilda* (family Tettigometridae) collected from phyllody diseased *Parthenium* can acquire these phytoplasmas. This suggests that *Parthenium* represents a pathogen reservoir for the phytoplasmas affecting agricultural crops in the country. Since phytoplasma infections can lead to sterility of the inflorescences, severe losses in yield of agricultural crops could be expected. Thus, control of *Parthenium* and putative vectors transmitting phyllody disease is important.

Keywords: Ethiopia, invasive weeds, *Parthenium hysterophorus*, phyllody, phytoplasma