



Tropentag, October 9-11, 2007, Witzenhausen

“Utilisation of diversity in land use systems:
Sustainable and organic approaches to meet human needs”

Studies on Transmission of the Phyllody of *Parthenium* by *Cuscuta* sp. and Different Insect-Vectors in Regard to Cultivated Plants

THOMAS HENNIGER¹, MARTINA BANDTE¹, CHRISTIAN ULRICHS², TAYE TESSEMA³, SUSANNE VON BARGEN¹, CARMEN BUETTNER¹

¹Humboldt-Universität zu Berlin, Institute for Horticultural Sciences, Phytomedicine, Germany

²Humboldt-Universität zu Berlin, Institute of Horticultural Science, Urban Horticulture, Germany

³Plant Protection Research Center, Weed Science, Ethiopia

Abstract

Parthenium hysterophorus L. is an annual herb of the *Asteraceae* family, originating from tropical America. It has become an invasive weed in tropical regions worldwide and is known in Ethiopia since 1980 from the region around Dire Dawa. Since then it has spread to the middle-high regions of the Ethiopian highland. Phyllody is an important disease of *P. hysterophorus*, which induces plant stunting and reduces seed production. Its causal agent is thought to be a phytoplasma and seems to be transferred by insect-vectors like leafhoppers. Aims of the study are to identify natural vectors and to investigate transmissibility and hostrange of this plant pathogen in Ethiopia.

Symptomatic plants of *P. hysterophorus*, collected in Ethiopia along roads in the surroundings from Debre Zeit and Nazareth at an altitude of about 1500 m, were used for transmission studies of the phytoplasmas to cultivated plants. Leafhoppers within the family Cicadellidae of a mass rearing established in Ambo as well as seedlings of *Cuscuta campestris*, which are suitable for the transmission of phytoplasmas, were used as experimental vectors. Furthermore, aphids and leafhoppers within the family Tettigometridae were collected from phyllody-infected *P. hysterophorus* plants around Debre Zeit and Nazareth with an exhaustor and transferred separately in 70% ethanol.

In opposite to previous studies by *Cuscuta campestris* was successfully established on healthy as well as on diseased plants of *P. hysterophorus*. Haustorias predominantly developed at the leaves and leaf-stalks. Especially young and small plants were particularly susceptible. Concluding, a method was established to determine the hostrange of the pathogen of the phyllody-disease. The technical course of the transmission studies with leafhoppers was successful, but no characteristic phyllody symptoms at *P. hysterophorus* were induced after transmission experiments with *Cuscuta campestris* and leafhoppers within the family Cicadellidae until now.

Collected insects were tested by a phytoplasma specific polymerase chain reaction (PCR). Therefore the primer-pair P1/P7 was applied to amplify an 1800 bp rDNA fragment. Gel electrophoresis of PCR reactions, obtained from isolated DNA from different leafhoppers within the family Tettigometridae, revealed products between 1500 bp and 2000 bp. These results will be confirmed by RFLP-analysis.

Keywords: *Parthenium hysterophorus*, phytoplasma, transmission

Contact Address: Thomas Henniger, Humboldt-Universität zu Berlin, Institute for Horticultural Sciences, Phytomedicine, Lentzeallee 55/57, 14195 Berlin, Germany, e-mail: phytomedizin@agrar.hu-berlin.de