INTER-UNIVERSITY EXCHANGE PROJECT
The 2nd UU-A International Symposium Series

宇都宮大学 UTSUNOMIYA UNIVERSITY

Root Parasitic Weeds: Biology and Control Measures

by

Emeritus Prof. YONEYAMA Koichi

（ Utsunomiya University ）

Date: **26th November 2021**

Time: 17:30-19:00 (Japan Time)

11:30-13:00 (East African Time)

08:30-10:00 (Ghana Time)

Format: Zoom Language: English

Closing date for application: 25th November 2021

How should we prevent attacks to African agriculture from parasitic weeds?

Please register in advance from the link or QR code below by November 25. UU-A office will email the Zoom information to the participants in advance. If any inquiries, please contact to the e-mail address below.

Application Form

https://docs.google.com/forms/d/1OnajvO8hK9AkF7L872Xmdpy5MUHs5uxCHsDA-zwDjBl/edit

■ Contact Information:
Office for Inter-University Exchange Project
Utsunomiya University
TEL : +81 28-649-5100
MAIL : tenkai@miya.jm.utsunomiya-u.ac.jp

■ UU-A Web Site TOP https://uu-a.utsunomiya-u.ac.jp/en/
Symposium Page https://uu-a.utsunomiya-u.ac.jp/en/symposium.html

This symposium is a part of Utsunomiya University Inter-University Exchange Project, named "Developing Human Resource to Contribute to SDGs by Merging African Potential and Japanese Scientific Technology", funded by Ministry of Education, Culture, Sports, Science and Technology of Japan.

Root Parasitic Weeds: Biology and Control Measures

Emeritus Prof. Koichi YONEYAMA (Utsunomiya University)

■ Research areas

My research falls into three inter-related areas:

1. Chemical communications between plant and living organisms including angiosperm parasites (*Striga* and *Orobanche*), mycorrhizal fungi, and rhizobia.
2. Purification and structural determination of biologically active compounds of plant origin including plant hormones.
3. Molecular design of biologically active compounds.

■ Root parasitic weeds: Biology and control measures

Witchweeds (*Striga* spp.) and broomrapes (*Orobanche* and *Phelipanche* spp.) are two most devastating root parasitic weeds causing severe damages to agricultural production all over the world. *Striga* spp. are hemiparasites and have functional chloroplasts, but their photosynthesis cannot support their survival and thus they should parasitize host plants, mainly monocots, maize, sorghum, rice, and sugarcane. *Orobanche* and *Phelipanche* spp. are holoparasites, lacking chlorophylls, and totally dependent on their dicot hosts, tomato, tobacco, oilseed rape, carrot, and legumes, for the supply of water and nutrients. Single root parasitic weed produces 10,000 to 500,000 dust-like tiny seeds which survive for more than 20 years in the soil. Therefore, potential host crops cannot be planted in the heavily infested fields for decades, leading to the abandonment of cultivation and the subsequent desertification.

Witchweeds (*S. hermonthica* and *S. asiatica*) are prevailing in sub-Saharan Africa, causing estimated annual loss of one billion US dollars in food crop production and threatening food supply for 300 million people. Broomrapes have been spreading from the Mediterranean countries to the rest of world and are now distributed widely.

The seeds of parasites germinate only when they perceive chemicals–termed germination stimulants–released from host roots. These chemicals are unstable and present only in the close vicinity to the host roots. Therefore, parasite seeds which can be attach to the host roots after germination will germinate; a sophisticated survival strategy of root parasitic weeds because tiny parasite seeds with limited food storage should connect to the host within a couple of day after germination or they will die.

As these parasites attach to the host roots, it is hard to detect parasitism in its early stage. In addition, any herbicides rapidly detoxified by and thus safe to host crops are not effective to the parasites which obtain water and assimilates only through hosts. These make root parasitic weed control very difficult.

In my talk, host-dependent life cycle of root parasitic weeds, their specially requirements for germination, germination stimulants, and various control measures are explained and discussed.

Commentator:
Prof. John Mwibanda WESONGA
Associate Professor of Horticulture
Horticulture and Food Security
Jomo Kenyatta University of Agriculture and Technology

Organizer:
Prof. Shinso YOKOTA
Team Leader of UU-A,
Professor of Agriculture
Utsunomiya University