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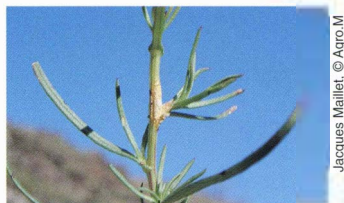
Narrow-leaved ragwort-rust interactions to develop biological control methods

Senecio inaequidens, the narrow-leaved ragwort, an exotic weed which invades natural areas and crops, such as the vine in Languedoc-Roussillon, is expanding throughout Europe.

This species is sensitive to a rust fungus from Australia, *Puccinia lagenophorae*, which reached France some thirty years ago. We are studying the epidemiology, population dynamics, and genetic structure of narrow-leaved ragwort, and the ragwort's interaction with the rust fungus, with a view to establishing whether the rust fungus could be used as a biocontrol agent. This project strengthens ongoing collaborations of the BGPI research group with associate members of Agropolis and with local laboratories of Australian (CSIRO⁽¹⁾) and American (EBCL-USDA-ARS⁽²⁾) organizations specialized in biocontrol

(1) CSIRO: Commonwealth Scientific and Industrial Research Organization
(2) EBCL: European Biological Control Laboratory - USDA-ARS: United States Department of Agriculture - Agricultural Research Services

Contact: Jacques Maillet, Agro-Montpellier,
maillet@ensam.inra.fr



Jacques Maillet, © Agro.M

Damage caused by *Puccinia lagenophorae* (rust) on narrow-leaved ragwort

Our group is pursuing three lines of research:

- In studying the mechanisms of interaction, we use gene mapping and cloning to analyze the pathogenicity of the agents that cause plant diseases, as well as the disease resistance of plants. Our study of the genomics of the defence reactions of rice is based on the plant materials produced by the teams of the Montpellier Génopole (see page 16).

- The study of the factors of viral epidemics transmitted by insects is based on a space-time study of the epidemics and an analysis of the major factors: vector biology, vector diversity, diversity of viral populations, host resistance, geographical fragmentation of cultivated regions, insect control methods. This work is being done in close collaboration with farmers and technical institutes specializing in this field.

- The study of the population genetics of phytoparasitic fungi, bacteria and nematodes, and of their interactions with resistant cultivars has been boosted by recent developments, such as the use of molecular tools to characterize pathogen populations and their mechanisms of genetic evolution. Plant-pathogen interactions are investigated in terms of the effect of host resistance on pathogen population structures, pathogenicity, and plant resistance.

Applications of the research projects include diagnosis of plant diseases and expertise on the sustainability and optimal management of resistance. Characterized resistances are used by the plant geneticists and breeders. Methods are proposed to limit vector transmission of viral infection. ■

Diagnosing viral diseases

The diagnosis of viral diseases is a major priority which calls for aetiology and pathogen characterization. Cirad is developing tests for the serological or molecular detection of a large number of microorganisms that attack cultures of banana, sugar cane, cacao, vegetable crops, palm trees including coconut palms. New detection methods are constantly reviewed to guarantee the quality of Cirad's phytosanitary testing in international quarantine services for sugar cane and the indexing of banana (VIC-INIBAP⁽¹⁾), taking into account the risk of emergence of new viral strains, or even new pathogens. Through these studies we hope to develop diagnostic kits for onsite use by our partners.

(1) VIC-INIBAP: Virus Indexing Center of the International Network for the Improvement of Banana and Plantain

Contact : Michel Peterschmitt, Cirad,
michel.peterschmitt@cirad.fr



Peanut Clump Virus (PCV) infecting sugar cane