Integrated control of coffee leaf rust

Reducing costs and protecting the environment

All coffee producing regions are affected by coffee leaf rust, a disease caused by the fungus Hemileia vastatrix. The disease is usually effectively controlled, mostly with copper fungicides applied preventively in accordance with treatment schedules, and increasingly by using resistant varieties. However, in a context of low prices and demand from the market for eco-friendly pesticide-free products, it is no longer enough to know how to control a disease: it is necessary to apply cheap methods, that pollute as little as possible, yet produce quality coffee for better remuneration.

The chemical control solution: reducing production costs and pollution problems associated with fungicide spraying

The results obtained by CIRAD and its partners are intended for producers who do not wish to replace their susceptible variety by a resistant variety because their product is earmarked for a specific market, or because they cannot afford to.

Defining recommendation domains

CIRAD, with its partners, has sought for ways of rationalizing chemical control and reducing the number of sprayings required. A survey conducted in Honduras revealed relations between the epidemic risks run by coffee plantations and factors such as height above sea level, soil acidity, coffee tree shade, fertilization, plant yields and green matter. These relations were used to define the epidemic risks associated with various production conditions and to recommend control methods adapted to such risks.

Partners
CATIE (Centro Agronómico Tropical de Investigación y Enseñanza, Costa Rica)
CBGP (Centre de biologie et gestion des populations, France)
IRD (Institut de recherche pour le développement, France)
PROMECAFE (Programa Cooperativo Regional para el Desarrollo Tecnológico y Modernización de la Caficultura en Centroamérica, República Dominicana y Jamaica)
Proposing an alternative to copper-based treatments

A new control strategy consists in using a triazole, a systemic and curative fungicide that pollutes less than copper fungicides, for the first spray application. In this way, the endogenous inoculum in the plantation responsible for triggering an epidemic is reached. This practice makes it possible to reduce the number of subsequent copper-based treatments.

The genetic improvement solution: increasing the durability of resistance, whilst preserving cup quality

The genetic solution proposed by CIRAD and its partners is one that is adapted to farmers preparing to set up new plantings, or those who wish to replace their susceptible varieties.

Increasing resistance durability

Several commercial varieties that are specifically resistant to certain races of leaf rust have gradually lost their resistance in various Asian countries. For fear that this loss of resistance might spread to all producing countries, CIRAD sought new sources of resistance reputed to be more durable, so-called partial resistances, since they sufficiently counter fungus development, though they do not completely eliminate it. Wild Coffea arabica genotypes of Ethiopian origin have thus been used as parents in crosses with commercial varieties, to provide these new hybrid varieties with this type of resistance.

Preserving cup quality

Some resistant commercial varieties are reputed to have off-tastes. The new hybrid varieties created do not have this disadvantage: their flavour characteristics are controlled at the CIRAD sensory analysis laboratory, so as to discard any planting material likely to be of poor quality.

Two questions research is trying to answer

What impact does farming system diversification have on coffee leaf rust epidemics? How can the resistances involved in the newly created varieties be sustainably managed?

For further information

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