COMUNICACIONES

Yield reduction in cowpea (*Vigna unguiculata* L. Walp) infected with cowpea severe mosaic virus in Costa Rica.

Sumario. El virus del mosaico severo del frijol de costa (cowpea severe mosaic virus) provoca pérdidas importantes en la producción de este cultivo en Costa Rica. Mediciones realizadas en Turrialba, Costa Rica, para determinar el efecto de la infección viral en la producción de grano mostraron reducciones del 84.8%, 82.1% y 55.6% cuando dicha infección ocurrió antes, durante y después de la floración, respectivamente.

Cowpea severe mosaic virus (CPSMV) is the most common disease on cowpea in Costa Rica (2, 5). Incidences of up to 90% have been reported by González *et al.* (2) in commercial fields. CPSMV is transmitted by several species of beetles in this country (4). The high population and diversity of the beetle vectors and the presence of wild hosts for the virus (4, 5) make it a potential threat for commercial cowpea production in Costa Rica. In Venezuela Debrot and Benítez (1) reported yield reduction of 33.4%.

The present study was conducted to measure the relative grain yield loss on cowpea caused by CPSMV in Costa Rica.

Materials and methods

Cowpeas cv. V-5 Moh were planted in an area of aproximately 700 m^2 in the experimental field of CATIE located in Turrialba. They were infected naturally with CPSMV by the beetles vectors.

The cowpea life cycle was divided arbitrarily in 3 stages: preflowering, flowering and postflowering. The plants in the field were checked for CPSMV symptoms every four days. Plants showing symptoms were labeled and tested for CPSMV by serology. Two hundred plants infected during the preflowering stage, 200 during the flowering stage and 200 during the postflowering stage were harvested. In addition, the yield of 200 healthy plants was assessed as a control. All plants were harvested when pods of healthy plants were mature. The number of pods per plant, the weight of seeds per plant and reduction in yield due to viral infection were recorded.

Results and discussion

Cowpea plants infected during the preflowering stage showed severe mosaic, absicion and malformation of leaves, stem necrosis, abortion of flowers and delayed pod maturity. Plants infected during the flowering stage showed similar symptoms but less severe. Plants infected during the postflowering stage showed only a mild mosaic. The results of the yield reductions are shown in Table 1.

When cowpea was infected at earlier stages of its life cycle the yield reductions were higher. Abnormalities caused by the virus in the plant as dwarfing, leaf absicion, mosaic, flower abortion and delayed pod maturity were probably the main factor involved in such reduction. The effect in pod maturity was important. Most pods from plants infected at early stages of life cycle did not mature when pods of healthy plants did. These pods were not harvested which consequently affected production. The lower yield reduction obtained when infection occurred at postflowering is probably due to a reduced severity of the disease.

The reductions in yield found in our studies are extremely high. Several factors are involved in the yield reductions caused by a disease. The cowpea cultivar is one of these factors. As V-Moh is highly susceptible to CPSMV, it is possible that decreases in production using other cultivars may be different.

Table 1. Yield reduction in cowpea infected with cowpea severe mosaic virus.

Stage of infection	Yield components[a]		Grain Yield reduction (%)
	Average number of pods/plant	Average weight of grains/pod (gr)	
Preflowering	1.54	1.42	89.80
Flowering	3.72	2.48	82.21
Postflowering	8.19	6.19	55.60
Healthy	16.27	13.94	0.00

[a] From a total of 200 plants harvested at each stage of infection.

Since the experiment was carried out in the field, many variables and complex interactions could be involved but our observations represent a natural situation in Tropical regions in Central America.

Summary

Cowpea severe mosaic virus causes significant yield reduction of this crop in Costa Rica. Measurements taken in Turrialba, Costa Rica for determining the effect of viral infection on grain production revealed reductions of 84.8%, 82.1% and 55.6% when infection occurred before, during and after flowering, respectively.

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