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RACES OF PUCCINIA POLYSORA IN NIGERIA

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Summary

On the basis of reactions incited on 12 maize differentials, two physiologic races of Puccinia polysora Underw. were differentiated. The two physiologic races are temporarily designated NPP. 1 and NPP. 2, respectively.

INTRODUCTION

Several races of Puccinia polysora Underw. are known to occur. In 1955 Ryland and Storey (3) reported the existence in East Africa of two different races of P. polysora which they designated as EA. 1 and EA. 2. In 1961 a third race, EA. 3, was reported in East Africa (4).

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On the basis of reactions incited on 11 corn selections, Robert (2) differentiated six new races of *P. polysora* (PP. 3, PP. 4, PP. 5, PP. 6, PP. 7, PP. 8), in addition to the three races present in East Africa. Recently a ninth race of *P. polysora* (PP. 9) was identified by Ullstrup (5). Preliminary experiments have indicated that more than one race of *P. polysora* exist in Nigeria². This paper reports the existence of two physiologic races of *P. polysora* present in Nigeria.

MATERIALS AND METHODS

Urediospores of *P. polysora* were collected from maize plants in the field and single-spore isolates were cultured separately on rust-susceptible maize leaf sections floating on a culture solution of 5% sucrose and 20 ppm kinetin (6-aminofurylethylaminopurine) in closed Petri dishes. The method of culturing *P. polysora* on maize leaf sections was similar to that reported by Hookey and Yarwood (1) for the culture of *P. sorghi* Schw. on detached leaves of maize. Urediospores from each isolate were inoculated to rust-susceptible seedlings in separate greenhouse chambers to provide inoculum for tests with maize differentials.

We planted seeds of 12 inbred lines of maize, selected as differentials in steam-sterilized soil in 5 1/2-inch plastic pots in the greenhouse. Twelve to thirteen days after planting, at the 4-leaf stage, we placed seedlings inside a humidity chamber and atomized them with water until drops of water were conspicuous on the surface of leaves. We dusted the inoculum, consisting of a mixture of one part urediospores to approximately 35 parts of talc powder, over the moist seedlings with a hand pump fixed to a cyclone spore collector. After leaving inoculated plants in the humidity chamber under conditions of high humidity for 24 hours, we removed them to benches in the greenhouse; the temperature was 22-29°C and the relative humidity 75-100%.

Pustules of *P. polysora* appeared 6 to 9 days after inoculation; plants were scored for reactions to each isolate 12 days after inoculation. The scoring system for reactions that developed on the third or fourth leaf was based upon the following reaction classes (Fig. 1):

Class R - Resistant reaction; chlorotic flecks or necrotic lesions on the inoculated leaf, never developing uredosori during the observation period.

Class S - Susceptible reaction; uredosori open at 10 to 12 days forming spores freely.

Class X - Mesothetic reaction; chlorotic flecks or necrotic lesions without uredosori interspersed among sporulating uredosori.

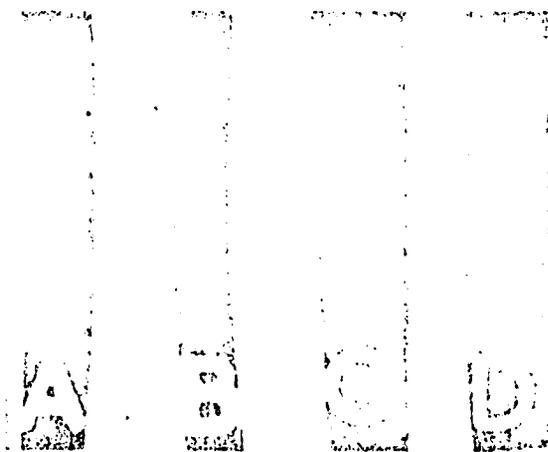


FIGURE 1. Reaction classes produced by *Puccinia polysora* on maize. A and B -- Resistant reactions on lines 015-1-7 and 013-21-1 respectively. C -- Susceptible reaction. D -- Mesothetic x reaction on line 04-2-1.

²Craig, J. 1966. Ann. Rept. 1965/66. Appx. 3. O. A. U. / S. T. R. C. Maize project at Moor Plantation, Ibadan, Nigeria. (Unpublished)

Table 1. Nigerian races of *P. polysora* and their infection reactions^a on 12 maize differentials.

Isolate	Reaction classes on maize differentials indicated												Race
	1	2	3	4	5	6	7	8	9	10	11	12	
SS1	S	S	R	R	R	R	S	S	S	S	S	S	NPP, 1
SS2	X	X	R	R	R	X	S	S	S	S	S	S	NPP, 2
SS3	S	S	R	R	R	R	S	S	S	S	S	S	NPP, 1
SS4	X	X	R	R	R	X	S	S	S	S	S	S	NPP, 2

^aR = Resistant reaction; X = Mesothetic reaction; S = Susceptible reaction.

RESULTS

On the basis of resistant or susceptible reactions incited on the 12 maize differentials (Table 1), two physiologic races of *P. polysora* were differentiated. Three inbred lines were resistant to all the isolates of *P. polysora*; however, different degrees of resistance were noticed. Although the symptoms of resistance on line 015-7 were no more than very minute chlorotic flecks (Fig. 1A), those on 013-1-7 and 013-21-1 consisted of slightly necrotic lesions (Fig. 1B). Line 017-1-8 was resistant to one race but expressed a mesothetic reaction to the other race. Susceptible or intermediate reactions to two isolates were expressed by maize differentials 04-2-1 and 04-2-4. Six differentials were susceptible to all the isolates.

DISCUSSION

In an attempt to establish the identity of races of *P. polysora* present in Nigeria, maize inbred lines known to carry genes for resistance to known races were used. Lines 051, 052, 053, 054, 055, 056 carried genes for resistance to races PP, 7, PP, 3, PP, 5, EA, 2, EA, 2 and PP, 6, respectively (Sprague; personal communication). Each of these lines was fully susceptible indicating the absence of races EA, 2, PP, 3, PP, 5, PP, 6 and PP, 7 among the isolates tested. We proposed that the two physiologic races of *P. polysora* differentiated in this study be temporarily designated as NPP, 1 and NPP, 2, until further investigations establish their relationship to other known races.

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