However, for *C. striatus* this trend persisted only in the case of CMcase and cotton activity. No consistent pattern of cellulolysis was noted for *Cyathus* sp. and *C. helenae*. For all four isolates, higher specific CMcase activity was noted on the 50th day but for specific cotton and filter paper activity no definite pattern emerged (table 1).

Birds nest group of fungi, especially species of *Cyathus*, have attracted the attention as effective degraders of plant residues only recently[6,11]. However, their natural habitat has been indicative of this capacity[12]. Species of *Cyathus* degrade both lignin and cellulose suggesting that they could help in composting of plant material which might subsequently be utilized either for mushroom cultivation[5,13], or for increased digestibility and nutrient supplementation[4]. The latter application would, however, require more detailed investigation of these and other species of *Cyathus* besides the use of genetically improved strains.

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ANTIGENIC RELATIONSHIP AMONG BACTERIOCIN-PRODUCING AND NON-BACTERIOCIN-PRODUCING STRAINS OF *CAJANUS*-RHIZOBIA

N. PARVEEN, S. CHAUHAN and Y.D. GAUR
Division of Microbiology, Indian Agricultural Research Institute, New Delhi 110 012, India

PIGEONPEA (*Cajanus cajan* L. Millsp), one of the most important pulse crop, is grown in the entire belt of semiarid tropics. Inoculation of this crop with *Rhizobium* is seldom successful. The major constraint being the poor or no nodulation by the inoculant strain due to severe competition with the indigenous strains, which outnumber the population of the former in soil and are usually poor in nitrogen fixation. Chauhan and Gaur[1] detected bacteriocinogeny among many strains of rhizobia isolated from pigeonpea (henceforth will be referred as *Cajanus*–rhizobia) and demonstrated ecological superiority of the bacteriocin–producing strain over non–bacteriocin–producing strain in liquid culture. The understanding of ecological superiority of such a strain in soil against indigenous population of the same host–rhizobia, demands a technique, which may not alter any of the intrinsic properties of the strain, and serology may be the only technique for this purpose. Chauhan and Gaur[1] also examined the antigenic constitution of 2 bacteriocin and 2 non-bacteriocin producing strains of *Cajanus*–rhizobia and observed complete antigenic homology among both the bacteriocin-producing strains. Non-bacteriocin-producing strains showed identity neither between each other nor with any of the bacteriocin-producing strains. Since the 2 bacteriocin-producing strains were isolated from different cultivars of pigeonpea, after growing the latter in soils collected from 2 distant locations in different years, it was of interest to know whether the antigenic identity among the bacteriocin-producing strains was common or a case of coincidence. Hence, the antigenic relationship of 6 bacteriocin-producing and 4 non-bacteriocin-producing strains was examined by using antisera of 2 bacteriocin–producing and 2 non–bacteriocin–producing other strains[1] (table 1) and the findings are reported here.

The origin and authenticity of all the strains of rhizobia, used in the study are described elsewhere[1]. The whole cell antigens were prepared according to

Table 1 *Immunodiffusion reaction of antisera of two bacteriocin-producing and two non-bacteriocin-producing strains with whole cell antigens of eight bacteriocin-producing and six non-bacteriocin-producing strains of Cajanus-rhizobia*

Antigen of strains	Precipitin lines formed with antisera of strains			
	Bacteriocin–producing		Non–bacteriocin–producing	
	B 3	ARS 44	ARS 109	BNFTR 1
Bacteriocin-producing				
B 3	a_1b_1	$a_1b_1c_1$	– – –	–
ARS 44	a_1b_1	$a_1b_1c_1$	– – –	–
ARS 77	– –	– – –	– – –	–
ARS 82	– –	– – –	– – –	–
ARS 84	– –	– – –	– – –	–
CC 4	– –	– – –	– – –	–
CC 5	– –	– – –	– – –	–
UASB 97	– –	– – –	– – –	–
Non–bacteriocin-producing				
ARS 109	– –	– – –	$a_2b_2c_2$	–
BNFTR 2	– –	– – –	a_2 – –	–
BNFTR 1	– –	– – –	– – –	b_3
F 4	– –	– – –	– – –	–
ARS 39	– –	– – –	– – –	–
ARS 116	– –	– – –	– – –	–

Identical precipitin lines have been denoted by the same alphabet suffixed with the same numeral, – denotes absence of precipitin line or the reaction for the same antigen.

the procedure described by Gaur and Sen[2] and the antisera, prepared by Chauhan and Gaur[1] were used. Antigen–antibody reactions were examined through miniatured – Ouchterlony's gel immunodiffusion technique[3] using hexagonal array of wells in 2 mm thick agarose gel, prepared on a microscopic glass slide. The other details of the procedure were similar to those described earlier[2], except that the diameter of the wells and the distances between them from edge to edge were 3 mm and 5 mm respectively.

The immunodiffusion reactions summarized in table 1, further confirmed the earlier finding[1] about complete antigenic identity between 2 bacteriocin-producing strains, B 3 and ARS 44. However, none of the other 6 bacteriocin-producing or 4 non-bacteriocin-producing strains showed any cross-reaction with the antisera of 2 reference bacteriocin-producing strains. Among non-bacteriocin-producing strains, except partial identity of BNFTR 2 with ARS 109, antigenic relationship neither between each other nor with any of the bacteriocin-producing strains was recorded. This shows serological diversity among bacteriocin-producing as well as non-bacteriocin-producing strains and also that in case any serological identity should occur, it is likely to be within the strains having similar bacteriocinogenic property.

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