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Contents

Chickpea chlorotic stunt virus, an important virus of cool-season food legumes in Asia and North Africa and potentially in Australia

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INTRODUCTION

Chickpea chlorotic stunt virus (CpCSV), a proposed new member of the genus *Polerovirus* (family *Luteoviridae*) was first described in Ethiopia in 2006 (1) and has since been reported from Eritrea (4), Syria (3), Egypt, Morocco and Sudan (2). It naturally infects many legume crops (e.g., chickpea, lentil, field pea, faba bean) as well as some leguminous weeds and four wild non-legume plant species (1, 2, 3, 4). Typical symptoms of CpCSV-infected plants are leaf rolling, yellowing and stunting (Figure 1-A). CpCSV is a phloem-limited virus that is present in very low concentrations and transmitted only by aphids (*Aphis craccivora* Koch.) in a persistent manner (1, 3).

This study reports the use of a few monoclonal antibodies to CpCSV (1, 2) for detecting different CpCSV isolates from 8 countries in Asia and North Africa.

MATERIALS AND METHODS

Sample collections, diagnostic techniques and reagents used—A total of 3265 food legume samples showing yellowing/stunting symptoms were collected from 8 countries (Azerbaijan, China, Eritrea, Ethiopia, Lebanon, Syria, Tunisia and Yemen) and tested for the presence of CpCSV using the following three mixtures of CpCSV monoclonal antibodies (MAbs) in tissue-blot immunoassay (TBIA): M-I = 1-1G5 + 1-3H4 + 1-4B12; M-II = 5-2B8 + 5-3D5; and M-III= 5-5B8 (1, 2). In addition, over 500 TBIA blots from chickpea, faba bean and field peas collected in northern NSW, Australia, for different types of symptoms were processed with the CpCSV MAbs.

RESULTS AND DISCUSSION

Figure 1-B shows how CpCSV is detected in infected plants by using TBIA.

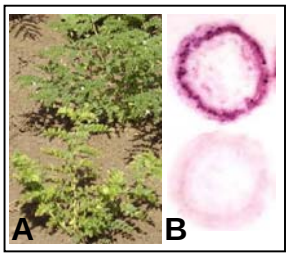

Figure 1. (A) Symptoms produced on a chickpea plant infected with chickpea chlorotic stunt virus (CpCSV); (B) TBIA detection of CpCSV in a stem blot from an infected chickpea plant (top) as compared to that from a non-infected plant (bottom).

Table 1 summarises the reactions of the MAbs with the samples from 8 countries in Asia and North Africa. Results obtained placed the tested samples in four groups: group A comprised 1218 samples (from Azerbaijan, Lebanon, Syria, Tunisia and Yemen) reacting with MAbs M-II and M-III; group B contained 254 samples (from Azerbaijan, China, Eritrea, Ethiopia and Tunisia) reacting only with MAb M-I; group C included 77 samples (from Azerbaijan and Ethiopia) reacting with MAbs M-I and M-II; and group D consisted of 38 samples (from Ethiopia and Tunisia) reacting only with MAb M-II. The presence of CpCSV was confirmed in a representative number of samples from each group and country by RT-PCR using specific primer sets. This is the first record of CpCSV in Azerbaijan, China, Lebanon, Tunisia and Yemen.

Testing of the Australian samples gave CpCSV-positive reactions for several chickpea, faba bean and field pea samples, which tested negative to antisera specific for other luteoviruses. These findings require reconfirmation, but are an indication that CpCSV (or a closely related non-described virus) may be present in Australia. Sequence analysis of RT-PCR amplicons is in progress and will shed more light on the relatedness among the aforementioned groups and to the two major CpCSV strains proposed by Abraham *et al.* (2).

Table 1. TBIA reactions of different luteovirus isolates with three groups of monoclonal antibodies raised against CpCSV

Country/Crop	No. of samples tested	No. of TBIA-positive samples	TBIA reaction with different CpCSV MAbs*		
			M-I	M-II	M-III
Eritrea					
Chickpea	211	32	+	-	-
Tunisia					
Chickpea	711	6	+	-	-
		8	-	+	-
		335	-	+	+
Faba bean	127	8	-	+	+
Azerbaijan					
Chickpea	320	11	-	+	+
		2	+	+	-
		153	+	-	-
Lentil	86	1	+	-	-
Ethiopia					
Chickpea	129	70	+	+	-
		29	-	+	-
		1	+	-	-
Lentil	9	5	+	+	-
		1	-	+	-
Faba bean	190	4	+	-	-
Fenugreek	80	55	+	-	-
China					
Faba bean	15	2	+	-	-
Syria					
Chickpea	579	460	-	+	+
Faba bean	362	279	-	+	+
Lentil	78	46	-	+	+
Pea	21	12	-	+	+
Yemen					
Pea	35	19	-	+	+
Lebanon					
Chickpea	32	3	-	+	+
Faba bean	232	43	-	+	+
Pea	35	1	-	+	+
Lentil	13	1	-	+	+

* M-I= 1-1G5+1-3H4+1-4B12; M-II= 5-2B8+5-3D5; M-III= 5-5B8 (1, 2)

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