

Phytoplasmas in Brazil: an update

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Abstract

In Brazil a number of plant species are affected by phytoplasma diseases, comprising wild and cultivated crops. Amongst the recently botanical species reported as natural phytoplasma host is sweet orange (*Citrus sinensis*) with huanglongbing symptoms. The majority of phytoplasmas identified in Brazil belongs to groups 16SrI and 16SrIII.

Key words: yellows diseases; witches' broom; classification; phytoplasmas; phytoplasmas.

Introduction

Phytoplasma diseases have been described in association with wild and economically important plant species in Brazil. Classification of associated phytoplasmas is of utmost importance to identify insect vectors and alternate plant hosts, enabling the establishment of disease control. In recent years new taxa have been identified associated with different plant hosts (table 1). Remarkable is the identification of a phytoplasma related to the group 16SrIX in citrus plants

with huanglongbing disease symptoms (Teixeira *et al.*, 2008); the leafhopper *Scaphytopius marginelineatus* was found the natural vector of the phytoplasma (Marques *et al.*, 2010). The finding of a phytoplasma in citrus, an important income crop to Brazil, may represent a push to general phytoplasma research in the country.

The majority of phytoplasmas reported in Brazil belongs to groups 16SrI and 16SrIII, following the worldwide distribution of phytoplasmas representative to these groups.

Table 1. Phytoplasma classification on the basis of RFLP analyses of 16S rRNA gene.

16S rRNA group	Host plants	Reference
16SrI	<i>Bougainvillea spectabilis</i> , <i>Erigeron</i> (<i>Conyza</i>) <i>bonariensis</i> , <i>Elaeis guineensis</i> , <i>Passiflora edulis</i> f. <i>flavicarpa</i> , <i>Saccharum</i> sp. (I-B), <i>Vitis vinifera</i> (I-B), <i>Zea mays</i> (I-B)	Davis <i>et al.</i> , 1994, Bedendo <i>et al.</i> , 1998; Bianchini and Bedendo, 2000; Neroni <i>et al.</i> , 2006, Silva <i>et al.</i> , 2006, Silva <i>et al.</i> , 2009, Montano <i>et al.</i> , 2007
16SrII	<i>Catharanthus roseus</i>	Barros <i>et al.</i> , 1998
16SrIII	<i>Begonia</i> sp., <i>Brassica oleraceae</i> var. <i>botrytis</i> , <i>Brassica oleraceae</i> var. <i>capitata</i> , <i>Brassica oleraceae</i> var. <i>italica</i> , <i>Catharanthus roseus</i> , <i>Crotalaria juncea</i> (III-B), <i>Cucurbita moschata</i> (III-J), <i>Cucurbita pepo</i> , <i>Euphorbia pulcherrima</i> , <i>Helychrisum bracteatum</i> , <i>Leonurus sibiricus</i> , <i>Luffa cylindrica</i> , <i>Lycopersicon esculentum</i> , <i>Malus domestica</i> , <i>Manihot esculenta</i> (III-B), <i>Momordica charantia</i> (III-J), <i>Sechium edule</i> (III-J), <i>Sicana odorifera</i> , <i>Solanum melongena</i> (III-B), <i>Melia azedarach</i> (III-B), <i>Solidago microglossa</i> , <i>Vitis vinifera</i>	Barros <i>et al.</i> , 1998, Amaral Mello <i>et al.</i> , 2006, Neroni <i>et al.</i> , 2006, Ribeiro and Bedendo, 2006, Montano <i>et al.</i> , 2000, Montano <i>et al.</i> , 2006, Amaral Mello <i>et al.</i> , 2007, Montano <i>et al.</i> , 2007, Ribeiro <i>et al.</i> , 2007a, Ribeiro <i>et al.</i> , 2007b, Rapussi and Bedendo, 2008, Melo <i>et al.</i> , 2009, Duarte <i>et al.</i> , 2009, Ekstein <i>et al.</i> , 2010, Flôres <i>et al.</i> , 2011a; 2011b
16SrV	<i>Crotalaria juncea</i>	Amaral Mello <i>et al.</i> , 2004
16SrVII	<i>Erigeron</i> (<i>Conyza</i>) <i>bonariensis</i> (VII-B)	Barros <i>et al.</i> , 2002
16SrIX	<i>Catharanthus roseus</i> , <i>Citrus sinensis</i> , <i>Crotalaria juncea</i>	Barros <i>et al.</i> , 1998, Teixeira <i>et al.</i> 2008; Wulff <i>et al.</i> , 2009
16SrXII	<i>Hibiscus rosa-sinensis</i>	Montano <i>et al.</i> , 2011a
16SrXIII	<i>Turnera ulmifolia</i>	Montano <i>et al.</i> , 2011b
16SrXV	<i>Catharanthus roseus</i> (XV-A), <i>Hibiscus rosa-sinensis</i> (XV-A), <i>Sida</i> sp.	Montano <i>et al.</i> , 2001a, 2001b, Eckstein <i>et al.</i> , 2011

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