

Wild Radish (*Raphanus* spp.) and Garden Rocket (*Eruca sativa*) as New Brassicaceae Hosts of Tomato chlorosis virus in South America

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DISEASE NOTES

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Wild radish (*Raphanus sativus* L. and *R. raphanistrum* L.) and garden rocket [*Eruca sativa* (Mill) Thell] plants displaying interveinal yellowing in the lower leaves were found in Mauá da Serra (Paraná State, Brazil). The garden rocket field with symptomatic plants was in close vicinity to tomato (*Solanum lycopersicum* L.) fields with high frequency of plants displaying symptoms similar to that induced by the *Crinivirus* (family *Closteroviridae*) species *Tomato chlorosis virus* (ToCV) and *Tomato infectious chlorosis virus* (TICV). Symptomatic wild radish plants were distributed throughout the tomato fields. All plants were heavily colonized by *Bemisia tabaci* biotype B (MEAM-1 species). Total RNA was extracted from the foliar

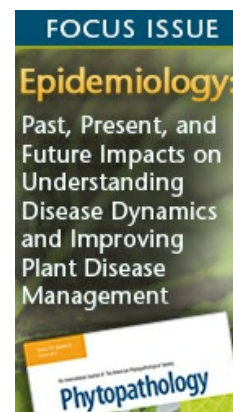
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tissue of garden rocket (isolate CR-190) and wild radish (isolate CR-192) in order to examine crinivirus infection in these species. RT-PCR assays with the HS-11/HS-12 primer pair yielded in all symptomatic samples a 587-bp amplicon, corresponding to the heat shock protein (HSP-70) homolog gene, which is highly conserved in tomato-infecting criniviruses ([Dovas et al. 2002](#)). These amplicons were used as templates to nested PCR using the ToCV-specific (ToC-5/ToC-6) and TICV-specific (TIC-3/TIC-4) primer pairs ([Dovas et al. 2002](#)). Only the 463-bp ToCV-specific amplicon was observed in the two isolates, indicating the presence of ToCV and the absence of TICV. Infection was also confirmed using dot blot hybridization with a coat protein gene-derived RNA probe labeled with digoxigenin and revealed with the chemiluminescent substrate CDP Star kit (Roche) ([Arruabarrena et al. 2015](#)). Strong ToCV-positive signals were obtained in both species. Amplicons of one garden rocket (GenBank Accession No. KT727952) and one wild radish isolate (KT727953) were sequenced. The alignments showed 99.5% identity with one another and from 99.5 to 100% identity with one ToCV isolate from potato in Brazil (EU868927). ToCV hosts have been reported in 10 botanic families, including members of the Brassicaceae family ([Kil et al. 2015](#)). However, to our knowledge, this is the first report of ToCV infecting *Raphanus* spp. in South America and the first worldwide report of garden rocket as a ToCV host. Wild radish plants are weeds very often associated with tomatoes in subtropical climates due to their natural level of tolerance to herbicides commonly employed in this crop. Garden rocket is cultivated in family-based systems, which are quite diversified and include also tomatoes. In South America, ToCV has been detected so far only infecting tomatoes and other solanaceous crops ([Arruabarrena et al. 2014](#)) and weeds ([Fonseca et al. 2013](#); [Arruabarrena et al. 2015](#)). The identification of these Brassicaceae species as natural ToCV hosts can have epidemiological implications since they may serve as sources of inoculum to the tomato crop in which ToCV infection has become a major problem in the subtropical regions of South America ([Arruabarrena et al. 2014](#)).

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