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## POTENTIAL ROLE OF *REPTALUS PANZERI* AS A VECTOR OF BOIS NOIR IN GERMANY

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Two planthoppers of the family Cixiidae are confirmed vectors of Bois noir (BN). They transmit *Candidatus* Phytoplasma solani (CPs) to grapevine. *Hyalosthes obsoletus* is the more common vector of the two species, while *Reptalus panzeri* has been reported as a vector in Serbia (CVRKOVIC et al., 2014). *R. panzeri* is a suspected vector in other regions, too, e.g. in Hungary where infected specimens have been identified in corn fields affected by maize redness (ACS et al., 2011). Other Cixiidae and Deltocephalinae have been identified as carriers or as vectors of CPs to other plants, but their ability to transmit CPs to grapevine has not been experimentally proved so far. Nevertheless, reports of an apparent lack of correlation between *H. obsoletus* and BN from various regions prompt further studies on the role of additional species as vectors of BN. Although there is generally a good correlation between *H. obsoletus* and BN in German winegrowing regions, this vector is occasionally rare in some regions with high incidence of BN. On some of these sites, *R. panzeri*, which is otherwise a rather rare species in Germany, has been found. Therefore, we performed a field study to estimate the significance of *R. panzeri* as a vector of BN in Germany with the objectives 1) to collect data on the occurrence, phenology and host range of *R. panzeri* at some of those locations, 2) to estimate the incidence of CPs in grapevine, alternative host plants and *R. panzeri*, and 3) to test the ability of this species to transmit CPs to experimental hosts and grapevine.

### MATERIAL AND METHODS

For a first monitoring, vineyards and surrounding uncultivated fields at viticultural sites in four winegrowing regions were checked for the presence of *R. panzeri* from 2009 to 2015 by sweep-netting wild vegetation. One location in the Middle Rhine valley and five locations in the Mosel valley were then chosen as monitoring and collection plots for this planthopper. Sticky traps were setup from May to August to monitor the activity of *R. panzeri*. The insects were also collected by sweep netting in order to gain information about feeding hosts of adults and to obtain specimens for transmission trials. Experimental hosts for transmission experiments were *Catharanthus roseus*, *Vicia faba*, and *Vitis vinifera*. Plants of each species were either exposed to 7 to 25 specimens of *R. panzeri* per cage or caged in groups of three to five plants with 47 to 150 insects (2646 insects in total).

### RESULTS AND DISCUSSION

Beside occasional captures of few specimens at different locations in the four winegrowing areas we found *R. panzeri* consistently at one Middle Rhine site (Boppard) and two sites of the Mosel region (Pommern; Platten). Three terraced vineyards at Pommern as well as a vineyard and a fallow field at Platten were sampled regularly between 2012 and 2015. Cixiidae constituted between 11 % and 31 %

of the total number of Auchenorrhyncha captured during this period. The proportion of *R. panzeri* varied between plots from 11 % to 98 % of all Cixiidae specimens. Other common Cixiid species were *H. obsoletus* and *Cixius wagneri*. The density of *R. panzeri* ranged from 0.1 to and 16.5 specimens/trap depending on plot and year. While there was no considerable variation between years at Pommern, the density of the planthopper at Platten oscillated between extremely low and high densities every second year. In general, significantly higher densities were observed in the uncultivated fallow fields compared to the vineyards. *R. panzeri* showed a closer association to grapevine than *H. obsoletus*, since adults were found regularly in the canopy of the vines. In fact, while there was no difference between traps exposed in 0.5 m and 1.25 m in the fallow plot, in the vineyard significantly higher numbers were caught on the upper traps in the height of the canopy compared to the traps on the level of the ground vegetation. Catches of *H. obsoletus*, on the other hand, are usually concentrated on the lower traps.

Adult *R. panzeri* were present on a wide variety of herbaceous plants including *Urtica dioica* and also some woody plants (*Prunus spp.*, *Salix sp.*, *Hedera helix*), but only *Clematis vitalba* was used at all sites. Immature stages were found only on the roots of *Ranunculus spp.* so far. With the exception of *U. dioica* none of the host plant species tested so far was infected with CPs.

The infestation of *R. panzeri* with CPs was low. Only 1.1 % (n=1192) of the tested specimens collected from 2009 to 2014 at Platten and Pommern were infected by CPs. This is a considerable difference to vineyards in Serbia, where CVRKOVIC et al. (2014) found that 21 % of *R. panzeri* were infected. All specimens (n=6) from Pommern were infected by tuf-b, while insects from Platten carried either tuf-a (n=4) or tuf-b (n=3). *R. panzeri* was regularly found on *U. dioica* on this site. In contrast to the low infestation in *R. panzeri*, the proportions of infected specimens of *H. obsoletus* collected in the same period on *C. arvensis* and *U. dioica* was 33 % and 11 %, respectively.

The results of the transmission trials corresponded to the observation of low infestation of *R. panzeri* by CPs. Only two of 30 *C. roseus* and none of 75 *V. faba* and 18 *V. vinifera* on which the insects were caged became infected. The two periwinkles were inoculated with CPs by *R. panzeri* collected from *U. dioica* at Platten. Both plants were infected by tuf-a.

Although *R. panzeri* is generally rare in Germany, it

occurred in high density in some of the investigated vineyard plots where it was the dominant Cixiid species. All of these plots are situated on steep xerothermic slopes, which seem to favor this species. Although adult planthoppers were regularly found feeding on grapevine, the role of *R. panzeri* as a vector of Bois noir in Germany is still unclear. Infestation with CPs is low and the preliminary results of transmission trials hint at a low probability of stolbur transmission by this species. However, the epidemiology of BN is characterized by periodical outbreaks of BN with temporary high infection pressure that lasting a few years only. The outbreaks are followed by longer endemic periods with low infection pressure and decreasing disease incidence (MAIXNER et al., 2006), which is the current situation since 2008. Population density, infestation and transmission efficiency of *R. panzeri* during an epidemic period of BN have to be studied before the significance of this species as a BN vector in Germany can be definitely assessed.

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