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Highlights on ecophysiological changes in Escadiseased grapevines in comparison to healthy plants.

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Grapevine Trunk Diseases (GTDs) such as Esca, are caused by a broad range of taxonomically unrelated fungal pathogens that attack the inner woody tissues of the grapevine. Fungal colonization of the wood can reach a critical point when the functional tissues are severely damaged, thus interfering with the vine physiology, leading to esca-foliar symptom expression or ultimately to death.

The purpose of this study is to better understand the ecophysiological changes inside the Esca-infected vines that show foliar symptoms, especially regarding the sap flow, the stomatal conductance and the foliar transpiration rate. Using these parameters, the influence of Esca *in planta* was evaluated, regarding both the circulatory activity of the whole plant and the efficiency of gas exchanges in leaves. The experiments were conducted in 16-year-old vines of the cultivar Cabernet Sauvignon (*Vitis vinifera*), that had been monitored for Esca symptoms since 2015, at the Luchey-Halde vineyard in Pessac-Léognan, (Bordeaux, France).

During the summer of 2016, heat sensors were installed on 5 asymptomatic and 5 Esca-symptomatic vines, to continuously measure the sap flow. Over the same period, a porometer was used to record stomatal conductance and foliar transpiration rate. This physiological monitoring showed that the sap flow density in Esca-symptomatic vines dropped significantly a week before the first leaf symptoms appeared. When water demand was the highest, the sap flow density was about two times lower in Esca-symptomatic vines than in asymptomatic vines. Equally, a similar trend was recorded with the stomatal conductance and the leaf transpiration rate of symptomatic vines. These parameters could be useful physiological indicators to assess the health status of a vine before the development of Esca-foliar symptoms.