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SBR and RTD - A new threat challenging breeding and agronomy in sugarbeet cultivation in Europe.

Two new sugarbeet diseases, “Syndrome des Basses Richesses” (SBR) and “Rubbery Taproot Disease” (RTD), are spreading in certain regions of Southern and Eastern Germany, Switzerland as well as South-East European countries. Both diseases are transmitted by plant hoppers (e.g. *Pentastiridius leporinus, Reptalus quinquecostatus* or *Hyalesthes obsoletus*), whose occurrence varies across Europe. They serve as vectors for two bacterial pathogens, the proteobacterium *Candidatus* Arsenophonus phytopathogenicus and/or the phytoplasma *Candidatus* Phytoplasma solani. Currently, it is assumed that the proteobacterium is the main causal agent of SBR, while RTD-expressing sugarbeet are infected with phytoplasma. SBR-infected sugar beet plants display severe symptoms including leaf yellowing and necrosis, asymmetric growth of lancet-shaped leaves, brown discoloration of taproot tissue, but most importantly, a loss of sugar content of up to 5% (absolute) and yield losses of up to 25%. RTD-infected sugarbeet suffer from severe water loss at very late stages of plant development, resulting in rubbery tissue that affects storage and processing. Severe yield reductions and susceptibility to secondary fungal and bacterial infections are the result. Therefore, the diseases must be brought under control by sugar beet breeders introducing genetic resistance and developing SBR- and RTD-tolerant or resistant varieties. Breeding programs are being established that also include the screening of wild beet accessions as genetic resources for SBR and RTD tolerance. A large-scale monitoring program is in place to monitor the spread and composition of pathogens and the flight activity of planthoppers. In addition, a rearing of planthoppers is being established to enable year-round experiments under controlled conditions. The agronomic approaches include investigation of the timepoint of planthopper immigration by controlled planthopper immigration with the use of net cover over the trial plots. Further investigations will evaluate the potential of seed treatment to control the planthoppers in the nymphal stage within the winter wheat crop rotation.