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Botrytis cinerea can rapidly produce massive amounts of inoculum on diseased plants. In addition to the endogenous inoculum, the airborne spora of *Botrytis* over a canopy may also include exogenous inoculum carried from a variety of hosts in open fields or even greenhouses. The relative proportion of both types of inoculum may influence the efficacy of control methods and the impact of selective pressures resulting from their implementation.

A trial was set up to quantify the impact of endogenous inoculum on disease development and on the population structure of *B. cinerea* in four compartments of an experimental tomato glasshouse of CTIFL (Balandran, France). Plants were grown in quasi-commercial conditions. Isolates were collected from the air spora 4 days before and 14 days after inoculation, of 6 plants per compartment, with one of two reference strains (differing in their microsatellite profile and aggressiveness on tomato). Disease development was monitored and isolates were collected on stem lesions 60 days after inoculation. All the collected isolates were analysed for their diversity according to 9 neutral microsatellite markers.

Among 80 isolates collected in the air spora prior to inoculation (while all plants were healthy), none had microsatellite profiles similar to either of the reference strains. Following inoculation, lesions developed and sporulation was observed on all inoculation points. Within 14 days, microsatellite profiles identical to those of either introduced strain represented 66% of the 353 isolates characterised from the air spora. The other multilocus genotypes detected from airborne spora were very diverse. The extremely high level of diversity confirms earlier data obtained with *B. cinerea* populations collected on different hosts and suggests that the entry of spores into the glasshouses (although these structures are usually considered as confined) is probably an important phenomenon which occurred regularly during the growing season.

The disease spread steadily to non-inoculated plants and incidence reached an average of 3-7 lesions per plant by 90 days after inoculation. Among 240 isolates collected from stem lesions at 60 days after inoculation, 58% and 33% had microsatellite profiles similar to the aggressive and to the less aggressive reference strains, respectively. This suggests that the displacement of the initially dominant airborne population of *Botrytis* was concomitant with its negligible contribution to the epidemic on tomatoes.

These results are compatible with the hypothesis of a polycyclic development of *Botrytis* epidemics in tomato greenhouses and illustrate the importance of endogenous inoculum in this growing system. Furthermore, they raise the question of possible host specificity within *Botrytis cinerea* in naturally occurring epidemics as few multilocus genotypes were shared between air-borne and plant populations.