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The pace of aggressiveness evolution and host adaptation in a plant pathogen population

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The efficiency of plant resistance to fungal pathogen populations is expected to decrease over time, due to an increase in the frequency of virulent, or highly aggressive strains. This dynamics may differ depending on time scale (annual or pluriannual), especially for annual crop pathogens with both sexual and asexual reproduction modes. In this study we investigated the pace of pathogen evolution and host adaptation. To this end we compared changes in two aggressiveness traits, latent period and lesion size, in a *Zymoseptoria tritici* population, over an eight-month growing season and a six-year period of wheat monoculture. Two pairs of subpopulations were collected in a wheat plot, the first at the beginning and end of a single annual epidemic, and the second at the beginning and end of the six-year period. We established a trend toward decreased latent period during the course of the annual epidemic, concomitant with a significant loss of variability, but not over the six-year period. We interpreted this contrast as the consequence of a trade-off between, on the one hand, a gain in aggressiveness by selection after several generations of asexual reproduction at the annual scale and, on the other hand, a decrease in the probability of sexual reproduction (Allee effect) and transmission to the next epidemic season. The conclusions of this study should be taken into account in the design and test of scenarios of deployment of partial resistance at the landscape scale.