

Figure 6 A simplified decision diagram to assist with developing resistance-breeding strategies to achieve durable disease resistance. Major gene resistance (MGR): resistance that has large effects, is based on the hypersensitive response and follows the receptor-elicitor model of the gene-for-gene interaction. Quantitative resistance (QR): resistance that has, on average, small, nearly equal, and additive effects that are equally effective against all strains of the pathogen.

the major contribution to a quantitative trait. The diagram assumes that both types of resistance are available to the breeder, and that major gene resistance is preferred because it is easier to recognize and is more easily utilized in a breeding program. We did not attempt to include the effects of different mutation rates, population sizes, or the full range of reproduction/mating systems. This diagram can be extended with many additional branch points to encompass the full range of possible interactions among evolutionary forces and potential pathogen population genetic structures. The outcome of the decision diagram is a general recommendation for choosing the type of resistance to use and the optimum deployment method with the aim of maximizing the useful lifespan of the resistance. This diagram should be considered in the appropriate context in a resistance-breeding program, as an aid to assist decision-making. It is not intended as an authoritative guide that will lead to durable resistance.

At one end of the decision diagram are pathogens that have strictly asexual reproduction, a low potential for gene/genotype flow, and small effective population