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Hidden benefits of genetic diversity: Interactions between invasive and indigenous species

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Definitions of biodiversity can be extended beyond species to include genetic diversity, yet the direct benefits of conserving genetic diversity have been suggested, rather than demonstrated. Here we examined the interaction between an invasive marine mussel and an indigenous species, including the effect of genetic resolution. The intertidal Mediterranean mussel, *Mytilus galloprovincialis*, has become invasive on every continent on the planet except Antarctica, encountering a variety of native mussel species. In South Africa, it has effectively displaced the indigenous mussel species on the cool-temperate west coast, but on the warm-temperate south coast it interacts with a different indigenous species, *Perna perna*. *Perna* and *Mytilus* show partial habitat segregation by height on the shore, while overlapping and co-existing in the middle of the zone occupied mussels. On the south coast, *Mytilus* reaches a distributional limit towards the east that coincides with a phylogeographic break in *Perna*. This limit lies precisely in the region where two genetic lineages of *Perna*, an eastern and a western lineage, overlap. *In situ* competition and translocation experiments indicate that *Mytilus* is capable of living farther east than it presently occurs. However, on that part of the shore where the two species can co-exist in mixed mussel beds, it is outcompeted by the eastern lineage of *Perna* and not the west lineage with which it presently co-exists. These results provide a clear example of a hidden benefit of genetic diversity with the spread of *Mytilus* towards the east held in check not by abiotic conditions, but by interaction with a different genetic lineage of *Perna*.

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