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# Managing concurrent evolution of resistance to fungicides: insights from modelling



Biotechnology and  
Biological Sciences  
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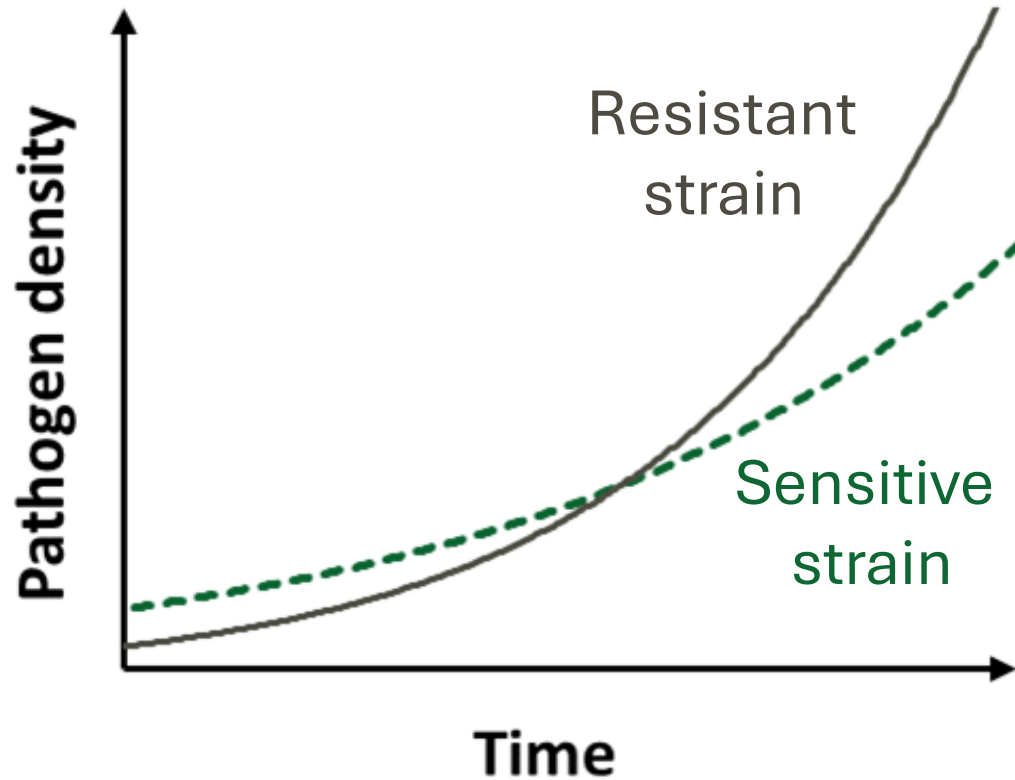
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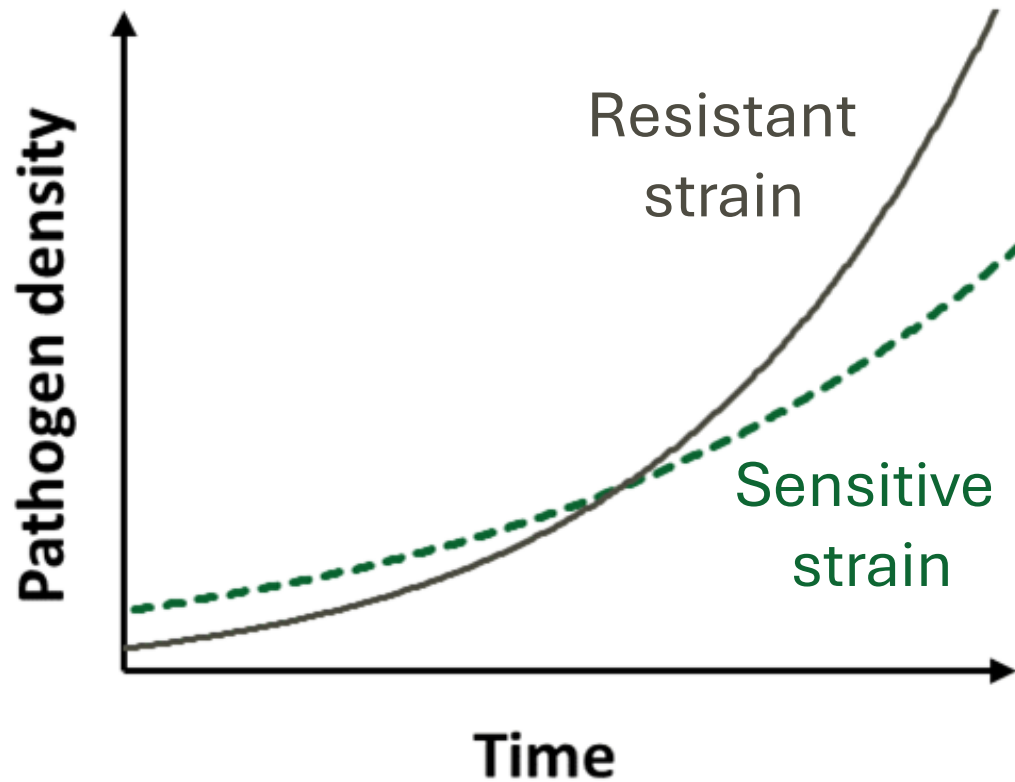
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# Why does resistance evolve?



When fungicide is applied, resistant strains outcompete sensitive strains.

# Why does resistance evolve?



$$S = (r_R - r_S) T$$

Selection →  $S$

Rate of increase of resistant strain. →  $r_R$

Rate of increase of sensitive strain. →  $r_S$

Exposure time. →  $T$

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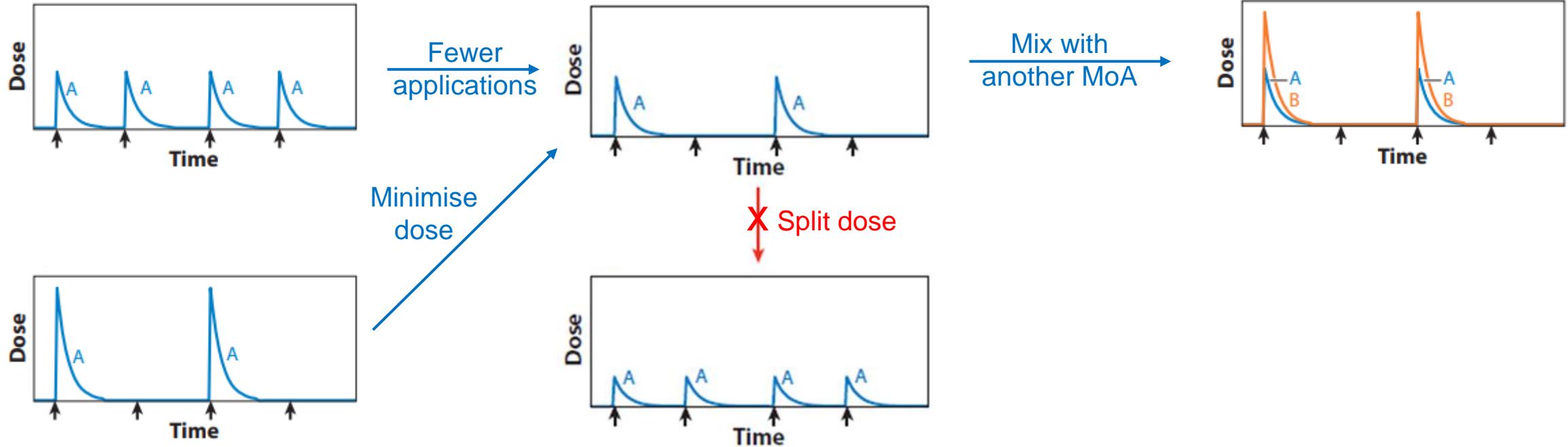
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# Reducing selection for resistance

Minimise dose &  
no. of applications

Avoid dose splitting

Use mixtures  
(another MoA)



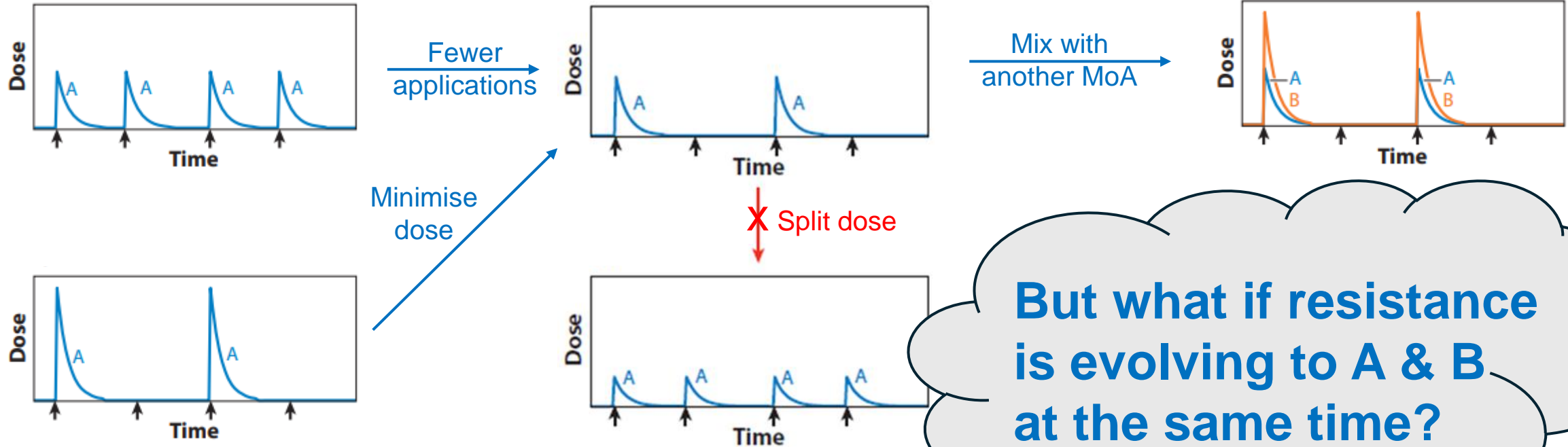
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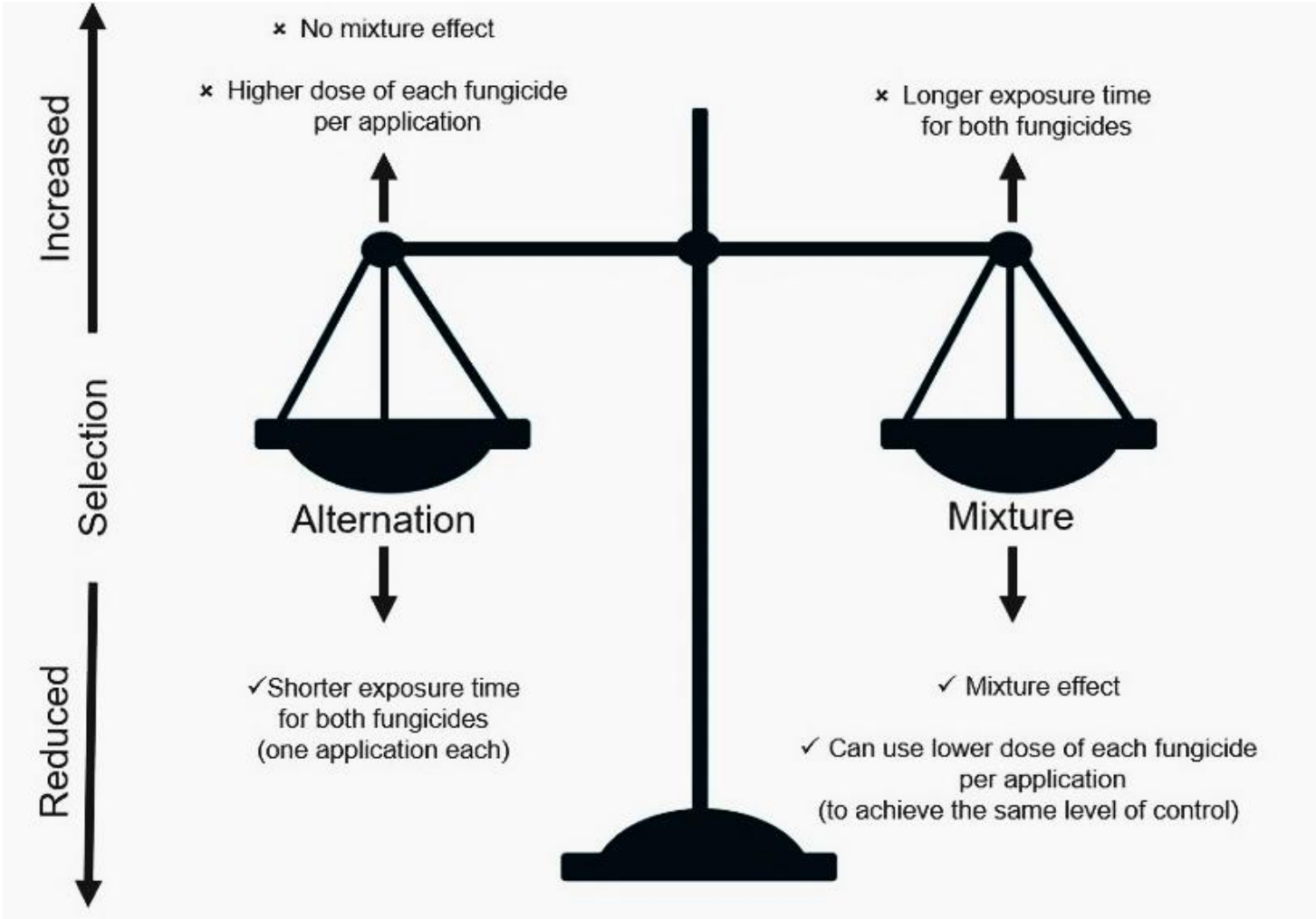
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But what if resistance is evolving to A & B at the same time?

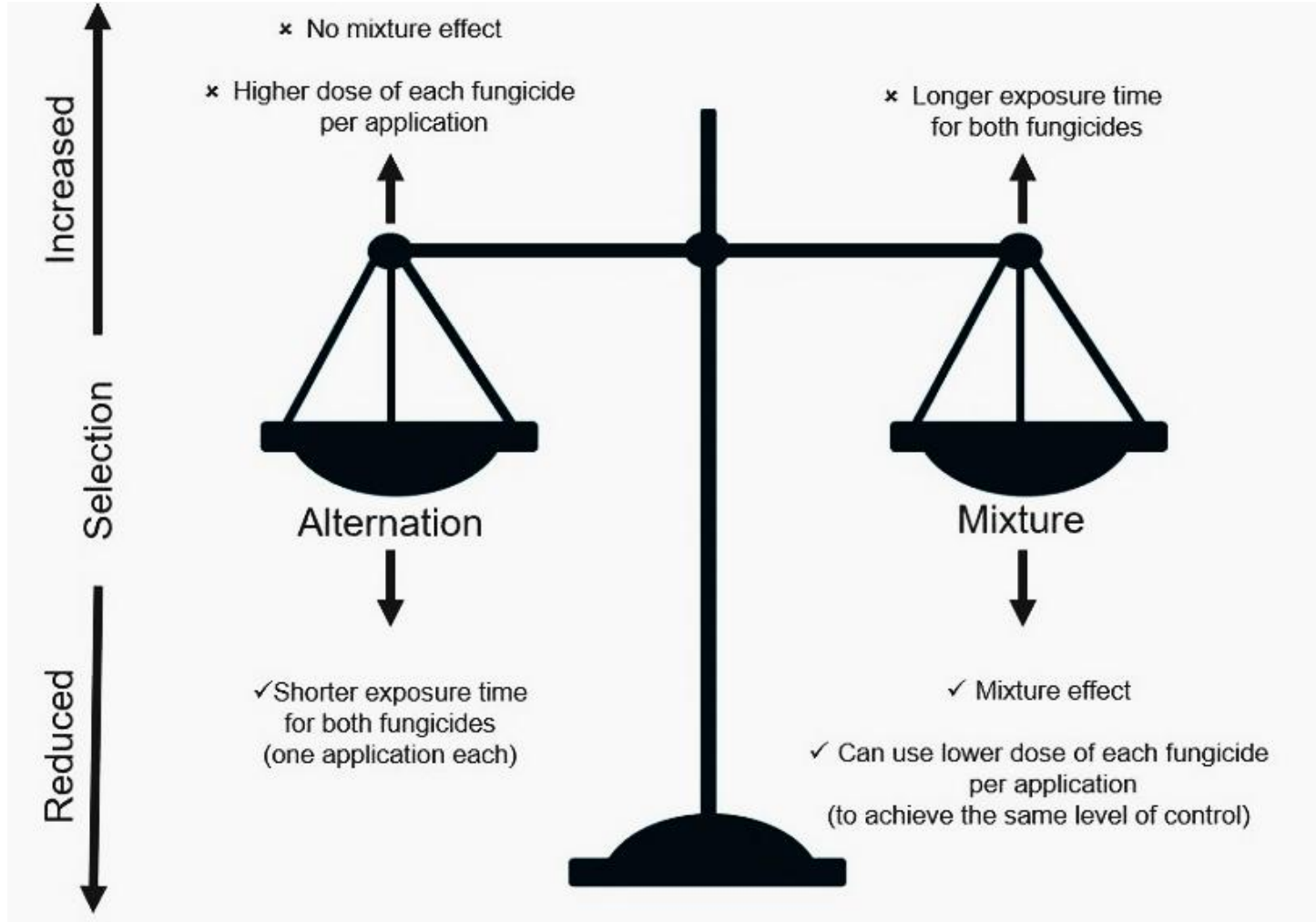
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# Trade-offs in managing resistance evolving to two or more fungicides



Is it better to  
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