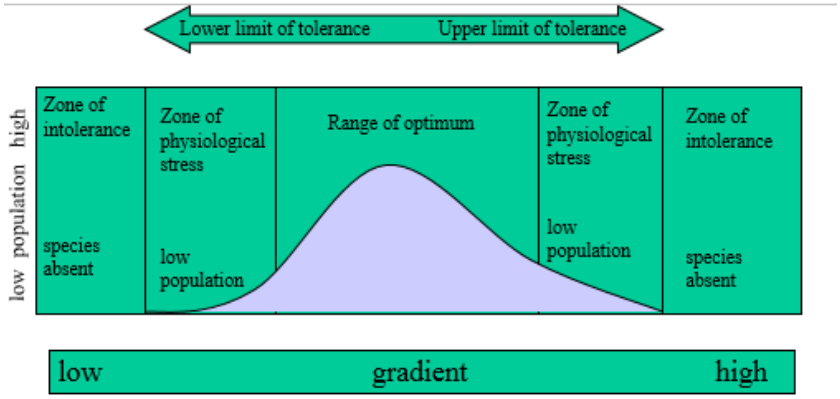
- Many abiotic factors (temp, water availability etc.) occur over a range of values
- Within this gradients, species will have an upper and lower range of tolerance where the species can be present
- If the conditions are ideal the abundance will be perfect
- Species usually function most efficiently over a limited part of each gradient.
- Towards the high and low end of tolerance the species suffers increasing physiological stress and cannot function efficiently and can only maintain low populations
-



ECOLOGICAL TOLERANCE

- stenothermal/eurythermal – refers to temperature
- stenohaline/euryhaline – refers to salinity

Adjustment of tolerance limits

- Acclimatisation – prolonged exposure to one side of the optimum can result in the shift of that optimum as a result of physiological or behavioural compensatory mechanisms or in the long term by genetic (evolutionary) change
- 'opting out' (dormancy/migration) is a useful way of withstanding temporary sub-optimum conditions. Plant seeds can lie dormant in the soil for many years (seed bank)

<u>Biotic factors limiting distribution</u>

- Intrinsic characteristics such as the dispersal strategies and the behaviour of the organism (e.g. habitat preferences). – these are a reflection of evolutionary history
- Interaction between species – predation, competition
- Anthropogenic (human) influences.

Intrinsic characteristics

Dispersal and barriers

- Organisms do not necessarily occupy all their potential range and if transported outside either normal range they may be able to survive, reproduce and spread. Absence from a particular area can be due to having failed to reach the potentially suitable area