Plants acting as a host ecosystem

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Studying entire ecosystems is expensive, labour intensive and often requires study over long time scales. M**icro-ecosystems** can allow study of **community dynamics** on a smaller scale in a time effective way. **Carnivorous pitcher plants** host a **community of organisms** (bacteria, rotifers, mites, yeast and more, see Fig 1.) known as the phytotelmata, that **function together as a micro-ecosystem.** This community works together to degrade prey caught in the pitfall trap.

Sarracenia purpurea (Purple Pitcher Plant, see Fig 2) has been **introduced** into **Northern Europe from North America** (Fig 3). In its native habitat mosquito larvae are the top predators, but there does not appear to be an insect equivalent in European populations potentially shifting community dynamics. ***Darlingtonia californica*** (Fig 2) has been introduced into **one site in Ireland where it grows with *S. purpurea*** (Fig 3), providing an excellent study site to look at plant influence on community dynamics compared to environmental effects.

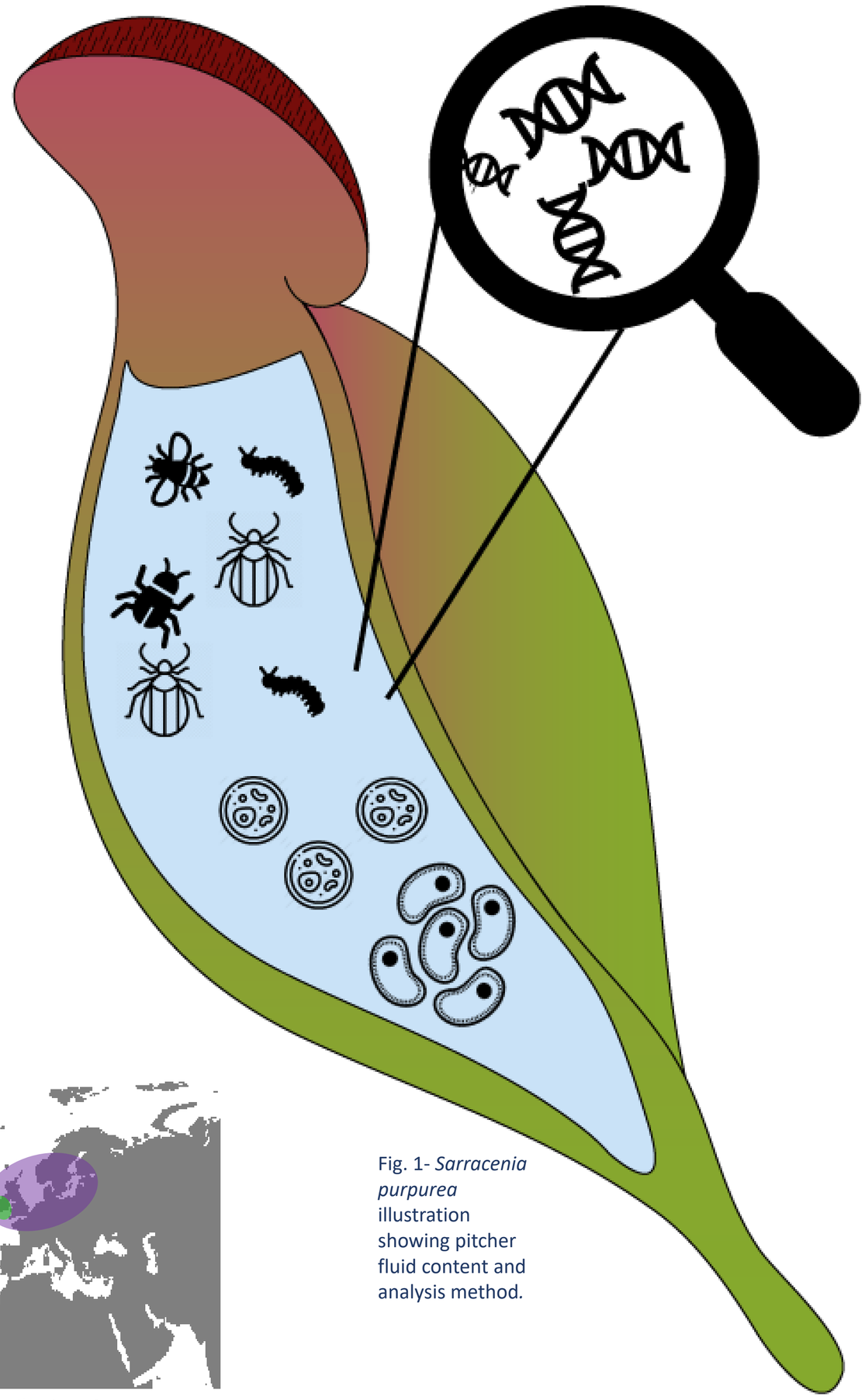

Fig. 1- *Sarracenia purpurea* illustration showing pitcher fluid content and analysis method.

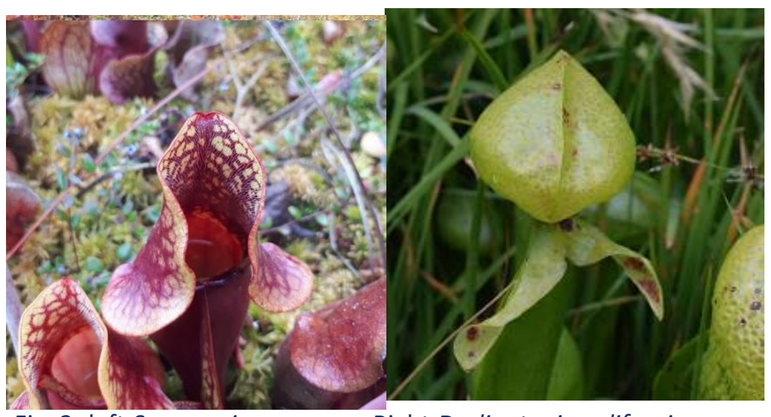

Fig. 2- left *Sarracenia purpurea.* Right *Darlingtonia californica.*

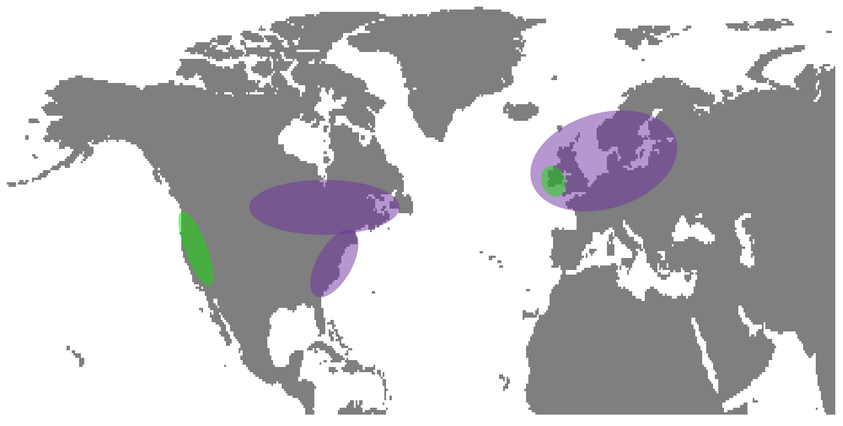

Fig. 3- purple zones, *Sarracenia purpurea* rough distribution. Green zones, *Darlingtonia californica.*

Research questions:

1) How do *S. purpurea* phytotelmata communities differ in native and introduced habitats?
2) Does plant or pitcher morphology play a role in phytotelmata structure?
3) How do the two species utilise different microorganisms to form their phytotelmata within the same site?

Approach:

- Sample pitcher fluid for in native and introduced ranges for both pitcher plant species. DNA analysis will be used to determine community composition.
- Measure plant, pitcher and environmental variables to determine factors driving community changes.

Applications:

- Model for larger ecosystems - how the role of top predator may influence community assembly.
- Model for introduced species and communities to determine how different environmental factors can shape their biology/dynamics.

Photo taken in site in Ireland- photo credits E.Goddard

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