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# How root traits are modified in secondary succession gradient along roadsides ?



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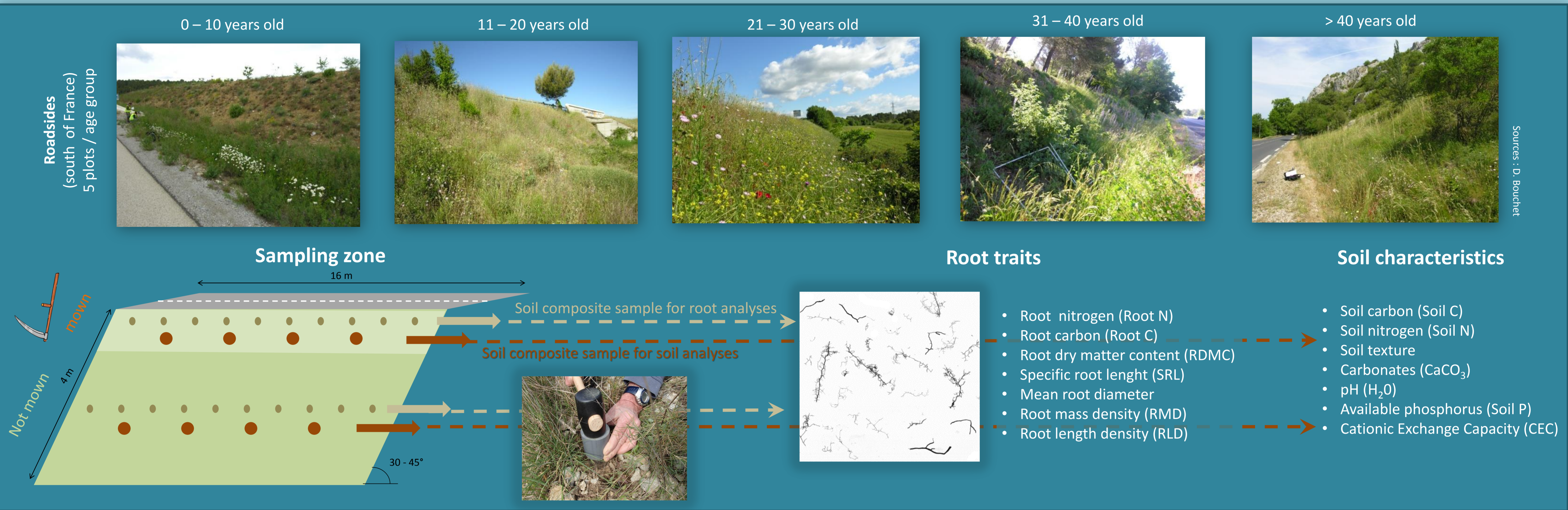
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## Background and aims

- Plant communities developing on linear embankments provide several ecosystem services, such as slope stabilization or refuge for biodiversity. Plant characteristics (traits) determine the way vegetation provides these services. Understanding how these traits vary within and between plant communities in various land use contexts is then relevant for ecosystem and landscape management.
- After a first phase of hydroseeding or plantation, dynamics of plant communities on road-sides can be considered as a secondary succession. Plant traits change during succession, due to species replacement and intraspecific adaptations, leading to potential variations in related ecosystems services. Variations of root traits undergoing succession can strongly impact soil stabilization and are poorly known, especially at the plant community level.
- For safety reasons, road-sides are periodically mown, about one to twice a year. Mowing may change root traits by modifying resources allocation. But little is known about the belowground effect of mowing.

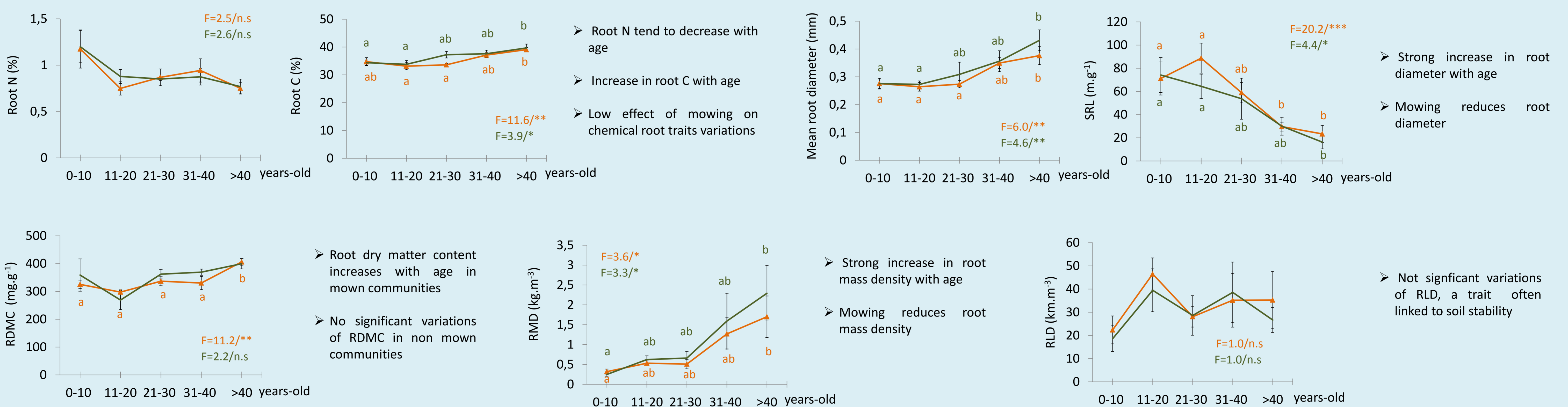
**Aim : How root traits are modified in periodically mown roadside plant communities undergoing secondary succession?**

## Material and methods



## Results and discussion

### How root traits are modified with age and mowing at the community level ?



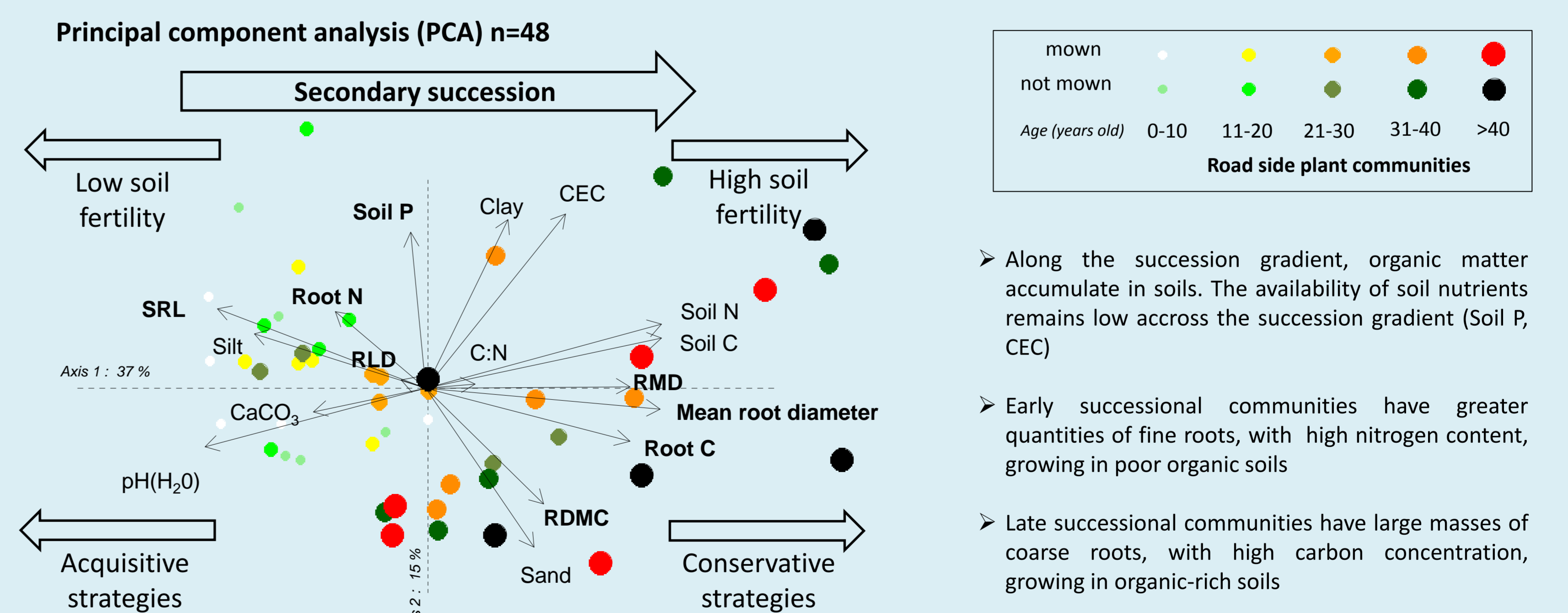
### Do age and mowing influence root trait variations ?

#### Redundancy analysis (RDA) n=48

|                             | Instrumental variables |          |              | Model  |
|-----------------------------|------------------------|----------|--------------|--------|
|                             | Age                    | Mowing   | Age x Mowing |        |
| Effect on root traits (F/P) | 5.8/**                 | 0.56/n.s | 0.56/n.s     | 2.9/** |

- Age significantly influences root trait variations at the community level
- Root traits are not modified by mowing (alone or in interaction with age)

### How soil parameters changes with modifications in root traits in secondary succession gradient ?



## Conclusion

- Significant variations in root traits occur along secondary succession gradients, with chemical traits having the lowest variations and morphological traits the highest.
- Early successional communities have relatively small quantities of fine and low dense roots. Conversely, late successional communities have large quantities of coarse and high density roots, suggesting an important replacement of fast growing acquisitive species by slow growing conservative species along the secondary succession gradient.
- Mowing reduces roots diameter and biomass but its general effect on root traits is not significant, suggesting a relative independence between below and aboveground compartments in plant communities.
- Association of more conservative species with more fertile soils is not common and may be linked to the fact that roadside are mainly mineral anthroposols after roadworks. Plant development add organic carbon into these systems.

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