Significance
Understanding what geographical and environmental factors increase legume populations and thereby forest productivity will enhance the accuracy of fire risk models and support decisions to mitigate bushfire hazards.

Background
The Black Saturday bushfires removed understorey vegetation, creating open, blackened forests. Despite this, rapid regrowth occurred, including Acacia species that have not been seen for decades.

Acacias are important to restore nitrogen (N) after fire. Thus, dense populations of acacias may promote future forest productivity.

However, population densities after fire can vary widely, even over short geographical distances, and the reasons for this are unknown. A recent study suggested low levels of phosphorous (P) in soil might give acacias a competitive advantage.

The Black Saturday bushfires provide a rare opportunity to investigate whether soil nutrients or other factors influence how acacias regrow following fire and may affect future fuel loads in fire-prone landscapes.

Field work
The numbers of individuals within a 2 m² box were used to calculate population density. Six species were identified growing at two to three densities.

Field sites for six species within the Murrindindi & Kilmore (Black Saturday) fire boundaries (grey).

Soil analysis
Preliminary soil analysis suggests that total P content in soil relates to how densely Acacia spp. regenerate after fire.

Conclusions
- Soil P levels may be related to population density of acacias. However, bulk density, pH, EC, and C:N ratio did not have any obvious correlations.

Overall, initial data support the hypothesis that acacias are favoured when soil P levels are low.

References

Population density: ★ High ★ Medium ★ Low