Tardy F., Moreau D., Dorel M., Damour G

**Trait-based characterisation of cover plants' light competition strategies for weed control in banana cropping systems in the French West Indie**s. EJA, 71, 10-18

Cover plants can be used as an ecological tool to manage weeds through competition for shared resources. Choosing the best cover plant species to maximize the service of weed regulation remains difficult. Our aim was to characterise the light competition strategies of a range of species on the basis of a small number of traits related to both acquisition of light and interference abilities, to help choose the most suitable cover plant species for banana cropping systems. Using a trait-based approach, we identified and measured the most representative plant morphological and functional traits to characterize the light acquisition strategies of 21 plant species including banana, cover plant and weed species. We identified trade-offs between plant traits There was a wide range of variations between species for all the traits. Two main trade-offs between traits were identified: resource acquisition vs. conservation and carbohydrates investment in height vs. leaf area. Five traits selected in a multivariate analysis explained 80% of the variability of light acquisition strategies in our panel of species. These were related to plant morphology (height and plant crown width), light conversion efficiency (specific leaf area), carbohydrates allocation (aboveground leaf area ratio), and carbohydrates demand (aboveground biomass). The growth habit and the light acquisition strategies were related. The characterisation of plant species using functional traits enabled us to hypothesise three light acquisition strategies shaped by interference abilities in four light competing strategies. We propose a new method to characterise and distinguish species through their ability to acquire light and to interfere aboveground with their neighbours.

This work, at the interface between agronomy and ecology disciplines opens a new direction of research in agronomy by using concepts and methods from ecological sciences to address agroecological issues. These results can enable agronomists or agricultural advisors to identify promising cover species on a few characteristics. Our results also provide a basis to construct a simplified tool to choose cover species for an effective biological regulation of weeds.

Banana and Arachis pintoï association