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A new class of nodule-forming bacteria

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The Leguminosae are recognised as the largest plant family with approximately 18,000 documented species. Their success is in no small part due to their ability to form nitrogen-fixing symbioses with rhizobial bacteria. All rhizobia so far identified belong to the α -subclass of the Proteobacteria. In the June 21 *Nature*, Lionel Moulin and colleagues at l'Institut de Recherché pour le Développement, Paris, report the discovery of legume nodulation by members of the β -subclass of Proteobacteria.

Moulin *et al.* characterized rhizobia from a number of tropical legumes and found that those from the nodules of *Aspalatus* and *Machaerium* were phylogenetically distant from known rhizobia (*Nature* 2001, **411**:948-949). Analysis of strain STM678 from the South African legume *A. carnosus* showed it to be most closely related to the *Burkholderia* bacteria (~97% identity), a genus within the β -subclass of Proteobacteria. A subsequent PCR screen of this strain revealed the presence of *nodA*, *nodB* and *nodC* genes encoding the Nod (nodulation) factors that act as signalling molecules in the initiation of the nodules characteristic of legumes.

The discovery that *Burkholderia* bacteria are also involved in rhizobium formation could have important implications environmentally. Some of the genus are capable of breaking down certain organic compounds and could provide a cheap and effective technique for cleaning up contaminated land.

So far the rhizobia of less than 10% of the Leguminosae have been characterized. The new results suggest that the symbiotic nitrogen-fixing bacteria are a considerably more diverse group than was originally assumed.

References

1. Moulin L, Munive A, Dreyfus B, Boivin-Masson C: Nodulation of legumes by members of the beta-subclass of Proteobacteria. *Nature* 2001, **411**:948-949., [<http://www.nature.com/nature>]