Figure 1 **Nodule variety.** a–c, **The nodules formed by nitrogen-fixing bacteria come in various forms, ranging from spherical, to branched and coralloid. The plants involved are,** a, ***Centrosema angustifolium*, a tropical forage legume;** b, ***Chadsia grevei*, a shrub from Madagascar; and** c, ***Enterolobium cyclocarpum*, a Brazilian tree.** d, **Nodules usually form on roots but on some species, such as *Aeschynomene* sp. from Senegal, shown here, they occur on stems.**

look at the full landscape of nodulation processes. Our detailed knowledge of nodulation comes from just a few species of the more highly evolved legumes, mainly from temperate or sub-tropical regions. But legumes are the third largest family of flowering plants, and nodulation has arisen in them on several separate occasions during evolution; many woody species still lack this ability[5]. There are thus wide variations in the specificity and strength of the association with rhizobia, especially in the tropics (Fig. 2).

Many interactions lack the close co-evolution of host and bacteria that leads to the highly effective recognition and developmental processes evident in pea and most temperate species. A single host species may be nodulated by several different genera and species of bacteria[5], with bacteria inside the nodules varying from the essentially parasitic to the highly effective in delivering ammonia[6]. Similarly, a single strain of bacterium may nodulate many genera and species of legume. Bacteria that induce nodules are now known to be far more heterogeneous than once thought, with many having close relationships with plant or animal pathogens — even to the extent of being members of the same genus, as occurs, for example, with species of *Burkholderia* and *Ralstonia*. Symbiotic and pathogenic relatives may have similar ways of avoiding their host's defence responses[7]. Genetic exchange between bacteria in soil may lead to some species losing the genes determining symbiosis and nitrogen fixation, and others gaining these genes[8]. We can expect many 'new' nodulating bacteria to be found in the future.

When coupled with the impressive range of techniques for studying whole genomes

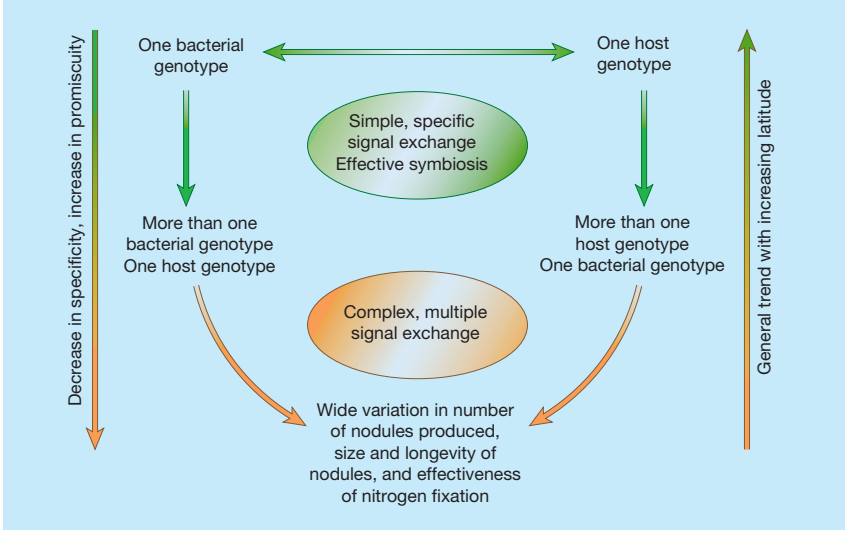

Figure 2 **No fixed relationship. Interactions between soil bacteria and host legumes vary widely in their specificity, and in the strength of the association and its results. The most widely studied interactions are the highly specific ones found in advanced legumes of a particular subfamily (the Papilionoideae)[5]. But the less specific associations found in many legumes from all subfamilies may be more common. There is an overall trend in specificity and likelihood of nodulation with latitude (and, to some extent, altitude): the higher the latitude, the more specific the relationship between the host plant and the bacterium.**

100 YEARS AGO

The Corporation of the City of London is rightly taking part in the crusade against tuberculosis. It has for many years instituted legal proceedings against farmers, butchers and meat-salesmen for sending tuberculous meat into the City markets, or for exposing the same for sale. Since it would appear that in some cases such offences may have been due to ignorance, the Public Health Department has issued a circular describing the indications of tuberculosis in the carcase, and the symptoms of the disease in the living animal.

ALSO...

Reuter reports that an eruption of the volcano Del Tierra Firme (Columbia), near Galera de Zamba, occurred on March 22 by which the village of Tiojo was destroyed. Brightly illuminated clouds, giving rise to the appearance of flames, were seen above the volcano on the night of March 24 by ships passing sixty miles off the coast.

From *Nature* 16 April 1903.

50 YEARS AGO

At all periods, mankind has danced to get rid of surplus nervous emotion — to obtain release. During the First World War a United States hospital unit took over a British general hospital soon after the Germans had launched mustard-gas attacks. The sights and sounds were particularly distressing and the nurses, new to war conditions, in many cases became hysterical, though doing their duties magnificently. When the matron organized dances, the nervous tension was released and the troubles ceased… Even in prehistoric times it would seem that dancing had a place in the various cults. Both in ancient Egypt and in Greece dancers are shown in the pictures of religious festivals; again, we read in the Old Testament how David danced before the Lord… Naturally, then, when Europe became Christian, dancing was absorbed into the new cultus, though the Church naturally looked on it with disfavour, and from time to time attempts to exclude it were made. Nevertheless, it was not only the populace who frequently expressed their religious emotions by dancing; the clergy and choir, too, sometimes danced during the services. The Easter dances before the high altar in the cathedral at Seville are well known and still take place, and many less famous though equally ancient ones still happen in churches or churchyards at certain times of the year.

From *Nature* 18 April 1953.