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about mushroom cultivation which they can use scrap farm as a growing media. The trainees learned to grow mushroom in complete steps. They can separate mushroom pure culture, they can grow mushroom in PDA and in whole grains. They can produce mushroom bag and growing and harvest it in farmhouse. They can make compost from used growing media to amend and improve soil fertility. Average soil pH increased from 4.8 to 6.3, OM increased from 1.1 % to 1.6%, avail.P and extr.K increased from 4.3 and 65 to 27 and 163 mg/kg, respectively. They can induce Barometer Earthstars (*Astraeus hygrometricus*), Bolete (*Thaeogyroporus porentosus* (berk. ET. Broome) and Mouthpiece (*Tricholoma crissum*, Macrocybe Crassa (Beak)) to occur in the nature. They grew 700 Barometer Earthstars, 500 Boletes and 500 Mouthpieces in the studied area. 94.39% of the trainee was most satisfied the course, all of them (100%) will use the knowledge to improve their soil quality, to create job and produce mushroom as a community enterprise product. Soil quality in the studied area have been improved and the poverty of the farmers have been eradicated by this project.
Keywords: mushroom; scrap farm; soil improvement; soil quality
Financial support: National Research Council of Thailand

(4875 - 1813) Large-area soil assessments for agriculture development in tropical Northern Australia

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There is a need to develop new land to meet the world's rising demand for food. As the population grows, conflicts arise for precious land and water resources while the quality of much farm land (and yields) declines from poor management (e.g. nutrient imbalances, erosion, salinisation, etc.). Furthermore, many countries recognise the strategic importance of hedging against climate uncertainty for food security, and the desire to boost exports. Australia's pattern of soil and land evaluation - the precursor to agricultural expansion - since European colonisation in 1788 was initially *ad hoc* and centred on the settled hinterlands. Since World War 2 it has been more strategic supported by government investments, which in cases extended to the sparsely populated remote areas and producing coarse scale soil and land assessments (i.e. 1:250,000 – 1:2M scale mapping products). The sentiment to expand Australia's agricultural land persists, and there has been renewed interest in assessing opportunities in remote tropical Northern Australia where land and water are considered abundant. This paper describes experience in mounting large-area soil survey and mapping campaigns in the region under substantial operational constraints. Experience is drawn from two projects, each simultaneously assessing soils from multiple catchments, including the Flinders and Gilbert Agricultural Resource Assessment (155,000 km^2) and the Northern Australia Water Resource Assessment (196,000 km^2). Constraints include: short and fixed project timelines, each three years and catering for field access determined by unreliable but distinct wet/dry season breaks; a scarcity of suitable legacy data to draw upon, including soil survey and mapping of appropriate scale and themes; shortage of national soil survey capacity (personnel, equipment), and; remoteness and difficult field access, including a sparse transport networks. The paper presents pragmatic adaptations to these constraints allowing project objectives to be fully met. Adaptations include: adoption of digital soil mapping (drawing on past investments in digital terrain and geophysics data), statistically-based survey design, and rapid soil analysis; use of legacy soil survey data (after robust data evaluation) from government databases, and; inter-government agency partnerships to address short-falls in field skills and equipment. The approach can be modified in other countries where similar circumstances occur.
Keywords: soil land assessment tropics Australia
Financial support: Government of Australia

(3421 - 866) Measurement of biological N_2 fixation in field-grown common bean cultivars in Brazilian Cerrado soil using ^{15}N natural abundance method

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The ^{15}N natural abundance method (NA) can be used for distinguishing among the N from soil and air in N_2-fixing plants and thus to estimate the contribution of biological nitrogen fixation (BNF). The aim of this study was to estimate the BNF contribution for plant N nutrition by NA method in eight common bean cultivars with different agronomical traits at field conditions. Two field experiments were carried out in an Oxisol at Brazilian Cerrado biome, with eight common bean cultivars inoculated with *Rhizobium*. The NA method was used to estimate BNF in plant shoots at mid-pod filling and in grains at physiological maturity. Three non-fixing plants were used as reference and the assumed B value was -1.2. The same bean cultivars grew under mineral N (90 kg ha^{-1} as urea) to estimate their yield potential without N limitations. Averaged grain yield was 1614 and 2942 kg ha^{-1} in the Experiment I, and 3284 and 3919 kg ha^{-1} in the Experiment II, respectively, under inoculation or mineral N. None cultivar under rhizobium inoculation surpassed the grain yield provided by mineral N in both experiments. The ^{15}N natural abundance ($\delta^{15}N$) in non-fixing reference plants was 5.49‰ in the Experiment I and 4.88‰ in the Experiment II. In Experiment I, the contribution of N derived from atmosphere (%Ndfa) reached a maximum of 25% in shoots at mid-pod filling, while varied from 18 to 35% in grains at maturity. In Experiment II, the %Ndfa ranged from 7 and to 50% in shoots and 29 to 51% in grains. In Experiment I, the N_2 fixation was estimated as 6.7 kg ha^{-1} in shoots, averaged across all cultivars, and ranged from 6.42 to 17.89 kg ha^{-1} in grains. In Experiment II, the lowest amount of N_2 fixed in shoots was 2.5 kg ha^{-1} and the highest 31.3 kg ha^{-1}. The cultivar that accumulated less N from BNF in shoots was also the same that accumulated less N in grains, whereas the greatest accumulation of N derived from BNF in grains was 69.7 kg ha^{-1}. In Experiment II, the average grain yield of the inoculated cultivars was double of Experiment I and the average of the amount of N_2 fixed was 3 to 4 times higher in shoots and grains, respectively, indicating that a higher contribution of N from symbiosis occurred when the bean crop achieved its optimum yield potential. The ^{15}N natural abundance method allowed to detect phenotypic capability to acquire N from BNF among field-grown common bean cultivars.
Keywords: *Phaseolus vulgaris*; rhizobia inoculation; $\delta^{15}N$; biological N fixation.
Financial support: EMBRAPA; CNPq.

(1884 - 1443) Pineapple mineral nutrition profile and diagnosis of nutritional status

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Pineapple nutritional requirements, particularly K and N, are superior than most tropical crops, but only a small fraction is retained in the fleshy fruits. In the field, most of the uptake occurs during vegetative development, when nutrients are applied mostly to the foliage. It is important to know the content and distribution of nutrients in the whole plant to improve fertilizer use and to produce well-nourished plants