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### Effect of shoot age, liming and potassium application for summer season lac cultivation on Palas (*Butea monosperma*) trees

Soumen Ghosal

Indian Institute of Natural Resins and Gums, India

Lac cultivation is a profitable venture for the farmers of Jharkhand, Chhattisgarh, Odisha, Madhya Pradesh, West Bengal etc. *Rangeeni* strain of lac insect is cultivated mainly on *Palas* (*Butea monosperma*) which is found abundantly in the lac growing regions. Lac yield from *palas* tree is relatively less in comparison to other hosts. An experiment comprising different levels of growth factors like liming (liming as per recommendation and no liming) and potassium (0, 500 and 1000 g/ tree) to make 6 treatment combinations replicated five times was conducted in the research farm of Indian Institute of Natural Resins and Gums, Ranchi during 2010-11 to 2012-13 to study the effect of soil fertility on *rangeeni* lac yield in the summer season (Oct/ Nov to June/July) on medium sized trees. Shoot age was 2.5 years for the first year and 7 months for next two years. Findings of the experiment visualized that lac yield ratio obtained in liming was 71 percent higher compared to no liming in case of 7 months age of shoots. However, no significant difference in lac yield ratio was observed in case of 2.5 years old shoots. Its effect was also reflected on yield attribute like sticklac weight per 100 g broodlac. Increased soil fertility due to liming might have supplied better nutrition to the host and the host in turn could supply better nutrition to the insect. Lac yield increased significantly (4 to 7 times) if rest period is increased to 2.5 years for medium sized trees. Interaction effect of liming and potassium was found to be significant in case of 7 months old shoots. Effect of potassium application was observed in the absence of liming and the highest dose could increase lac yield 2.8 times than that of control on 7 months old shoots. Similarly, liming in the absence of potassium application proved to be the best treatment and response of liming decreased steadily with increase in level of potassium. Applied potassium might have facilitated host to support nutrition of lac insect in a better way which ultimately increased lac yield.

soumen66iirng@gmail.com

### Atmospheric CO<sub>2</sub> enrichment effect on resource utilization and crop bio physical characteristics in Chickpea (*Cicer arietinum* L.)

Saurav Saha, V. K. Sehgal, D. Chakraborty and Madan Pal

Indian Council of Agricultural Research (ICAR), India

An open top chamber experiment was conducted at the Indian Agricultural Research Institute, New Delhi to study the response of *Akabuli* chickpea (Pusa-1105) towards atmospheric CO<sub>2</sub> enrichment (560±20 ppm) with subsequent changes in canopy structure and other plant biophysical characteristics for two consecutive years 2010-11 and 2011-12. Peak value of leaf area index (LAI) was amplified by 22.6%, with a significant reduction in canopy extinction coefficient (k) by 18.5% under elevated CO<sub>2</sub>. In spite of increased LAI, there was no significant difference in cumulative radiation interception (IPAR) by the crop; however, the efficiency of radiation conversion into biomass was 85% higher under elevated CO<sub>2</sub>. No significant change in cumulative root water uptake was observed, although the crop water use efficiency was 73.5% higher under elevated CO<sub>2</sub>. The specific leaf area significantly reduced under elevated CO<sub>2</sub> with an increased in area per unit leaf, indicating the possibility of occurrence of thicker leaf lamina due to elevated CO<sub>2</sub> exposure along with increased specific leaf nitrogen and wider leaf C:N ratio, especially during anthesis. Increase in efficiency for biomass accumulation, due to increased leaf photosynthesis along with 20% increase in the harvest index, were the major contributors for improved resource use efficiency of chickpea under elevated CO<sub>2</sub>. Results from the study will help in modifying the crop growth models to account for the elevated CO<sub>2</sub> induced change in resource utilization in chickpea.

#### Biography

Saurav Saha has completed his Masters (2010) and Doctoral studies (2010 - 2012) in the discipline of Agricultural Physics, from the Indian Agricultural Research Institute, New Delhi. Presently he is working as a Junior Scientist in the ICAR Research Complex for North Eastern Hill Region, Umiam, Meghalaya. He has so far 2 publications, one each in *Agriculture*, *Ecosystems and Environment* and *Agricultural and Forest Meteorology* journals. His future goal is to serve the Indian agriculture with his best scientific inputs.

sauravs.saha@gmail.com