

**Agroforestry
Newsletter**

National Research Centre for Agroforestry, Jhansi-284 003

Vol. 20 No. (2)

April-June, 2008

**BIOMASS, CARBON AND NITROGEN DYNAMICS AS AFFECTED BY
DIFFERENT PRUNING REGIMES IN *ALBIZIA PROCERA* BASED
AGRISILVICULTURE SYSTEM**

Management of the tree component in agroforestry systems at suitable age intervals is of vital importance to optimize the biomass production of understorey vegetation. Canopy pruning is a necessary management practice in agroforestry systems for reducing both above and belowground competition with associated crops. A field experiment was conducted during 2005 – 07 at the Research Farm of National Research Centre for Agroforestry, Jhansi (UP), India to quantify the role of canopy pruning on biomass, carbon and nitrogen dynamics in *Albizia procera* (Roxb.) Benth. based agrisilviculture system. The experiment consisted of three pruning regimes viz., 70% canopy pruning, 50% canopy pruning and control (unpruned tree), two crop sequences viz., blackgram (*Vigna mungo* Roxb.) – mustard (*Brassica juncea* L. Czern. & Coss.) and greengram (*Vigna radiata* Roxb.) – Wheat (*Triticum aestivum* L. emend. Friori & Paol.), sole tree and sole crop. The experiment was conducted in split plot design with three replications.

Growth of *Albizia procera* (dbh and height) increased with tree age and increment in dbh and height was almost stable at 5.0, 6.0 and 7.0 years age. Tree biomass also increased with age with a mean annual increment of 6.30 t ha⁻¹ year⁻¹. Allocation of biomass in different tree components was in the order of branch > root > main bole > foliage. The annual increment in carbon accumulation was 2.46 to 3.45 t C ha⁻¹ year⁻¹ at different age of the tree. Of the total carbon accumulation, above and belowground biomass accounted for 68.7% and 31.3%, respectively. The concentration of nutrients (N, P, K, Ca and Mg) among tree components was generally graded in the following order: leaves > fine root > coarse root > branch > main bole. Total nutrient storage in tree biomass was in the order of N > Ca > K > Mg > P.

Biomass, carbon and nutrient accumulation in trees with blackgram – mustard crop sequence was comparatively higher than green gram – wheat crop sequence but differences were not significant. Among the pruning regimes, biomass, carbon and nutrients were in the order of control (unpruned) > 50% canopy pruning > 70% canopy pruning. Tree growth, biomass, carbon and nutrient accumulation of sole tree was less than trees in the agrisilviculture system.

The biomass, carbon and nutrient accumulation in blackgram, green gram, wheat and mustard increased with the advancement of crop growth but increment was almost stable at all the growth stages. However, biomass, carbon and nutrient accumulation varied between the crop. Component wise biomass and carbon of herbaceous layer was in the order of crop > weed > root > floor litter. Nutrient accumulation in herbaceous biomass was in the order of N > K > Ca > P > Mg, except N in wheat, which increases upto 60 DAS and then slightly declined. The crop grown with 70% canopy pruning had accumulated higher biomass, carbon

and nutrients than 50% canopy pruning and control (unpruned). Sole crop accumulated higher biomass, carbon and nutrients than that of the agrisilviculture system, except weed biomass in *rabi* season.

The growth, yield and yield attributing characters of intercrops were significantly higher in 70% canopy pruning than 50% canopy pruning and control (unpruned). In sole crop, growth, yield and yield attributing characters of intercrops were comparatively higher than that of the agrisilviculture system.

Soil microbial biomass C (C_{mic}), N (N_{mic}) and C_{mic} -to- N_{mic} ratio was higher before sowing of kharif crop as compared to after harvesting of *rabi* crop. Soil microbial biomass C and N was significantly higher in 70% canopy pruning than 50% canopy pruning and control (unpruned). However, soil C_{mic} -to- N_{mic} ratio was higher in control (unpruned) than 50 and 70% canopy pruning. In the agrisilviculture system, soil microbial biomass C and N was comparatively higher than pure crop (without tree) whereas soil C_{mic} -to- N_{mic} ratio was less than pure crop (without tree).

The improvement in soil fertility was seen in *A. procera* based agrisilviculture system after two years of the study. There was slight increase in soil EC, OC, N, P, and K and decrease in pH in comparison to the state before experimentation.

Shabir Ahmad Dar (Ph. D. Scholar)
Supervisor Dr. Ram Newaj,
Principal Scientist (Agronomy),
National Research Centre for Agroforestry, Jhansi

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ESTABLISHMENT OF GIS AND REMOTE SENSING LAB

A GIS and Remote Sensing Lab was inaugurated by Dr. K.A. Singh, Director, IGRI on the occasion of 20th foundation day of the Centre. Dr. S.K. Dhyani, Director and all the scientists of NRCAF were also present. This lab has been established under a DST project "Spatial and Temporal Analysis of Agroforestry Interventions in North-western India using GIS and Remote Sensing". Lab is equipped with A0 size scanner (H P Designjet 4500) with resolution of upto 1200 dpi, one strip scanner (DESKAN) with resolution upto 600 dpi, one high configuration workstation and one desktop computer with 22" TFT monitor. Besides this, one color laser printer is also available for color printing. Arc GIS 9.2, a GIS software and IDRISI Andes, an image processing software have been installed on workstation. For

ground verification, a Global Positioning System (GARMIN MAP 76CSx) of less than 10m accuracy has been purchased and tested in the field.

INTERACTIVE WORKSHOP ON ADMINISTRATIVE AND FINANCIAL MATTER

Dr. S. K. Dhyani, Director, Sh. D. K. Awashti, AAO and Sh. S. B. Sharma, AF&AO attended Special Interactive Workshop on Administrative and Financial Matters for the ICAR Institutes held at Zonal Coordinating Unit-I, ICAR, Ludhiana during 17th to 18th April, 2008.

HUMAN RESOURCE DEVELOPMENT

- Dr. P. Rathkrishnan Scientist (Forestry) participated in ICAR Training Cum Workshop on “IP and Technology Management (Theme: Genetic Engineering)” at Indian Agricultural Research Institute, Pusa, New Delhi from 23rd – 25th April, 2008.
- Dr. V. K. Gupta, Pr. Scientist (Tree Breeding); Dr. O. P. Chaturvedi, Pr. Scientist (Agroforestry/Forestry); Dr. S. P. Ahlawat, Sr. Scientist (Plant Breeding); Dr. R. P. Dwivedi, Sr. Scientist (Agril. Extension); Dr. A. K. Handa, Sr. Scientist (Forestry); Dr. R. V. Kumar, Sr. Scientist (Plant Breeding); Dr. A. Venketesh, Sr. Scientist (Forestry); Dr. P. Rathkrishnan, Scientist (Forestry), Sh. Rajendra Singh, Technical Officer and Sh. C. Sivadasan, P S participated in the Annual Group Meeting of AICRPAF at BAU Ranchi from 26th to 28th April, 2008.
- Dr. O P Chaturvedi, Pr. Scientist (Agroforestry/Forestry), Dr. A K Handa, Sr. Scientist (Forestry) and Dr. A. Venketesh, Sr. Scientist (Forestry) participated in the meeting of Collaborative Research Project between IFGTBC (ICFRE), Coimbatore; NRCAF and TNAU, Coimbatore entitled “Demonstration of Agroforestry Techniques for Enhancing the Livelihood Opportunities in Different Agroclimatic Zones of Tamil Nadu” from 13th to 14th May, 2008 at TNAU, Coimbatore.

LINKAGES

NRCAF has contributed in preparation of Action Plan for Combating drought in Bundelkhand region in association with SIRD and district administration. The meeting on preparation of action plan was convening on 17th May 2008 under the chairmanship of DG SIRD in the presence of Commissioner Jhansi, District development authorities and delegates of NRCAF.

WOMEN CELL

A meeting of Women Cell was held on 19th May, 2008 at NRCAF Jhansi. Km. Divya Sharma, Professional –I, Development Alternatives (NGO), Taragram, Orchha, Tikamgarh (M.P.) delivered a lecture on Gender Sensitization to all female RAs, SRFs and students of the Centre.

RETIREMENT

Sh. C. Shivdasan, P S to Director retired on 31st May 2008. The staff members bid a grand farewell.

PROMOTION

Sh. A.K. Chaturvedi, Personal Assistant promoted to Personal Secretary to Director w.e.f. 1st June, 2008.

Sh. Hoob Lal, Jr. Stenographer promoted to Personal Assistant w.e.f. 16th June, 2008.

VISITORS

- Sh. V. K. Mittal (IAS), Vice Chancellor, Bundelkhand University, Jhansi
- Sh. Ramendra Tripathi (IAS), Commissioner, Jhansi
- Dr. K. A. Singh, Director, IGFRI, Jhansi
- Sh. S. K. Sharma, Chief Conservator of Forest, Jhansi

INSTITUTE JOINT STAFF COUNCIL

Institute Joint Staff Council (IJSC) meetings were held on 19th May and 28th June 2008 under the Chairmanship of Dr. S. K. Dhyani, Director of the Centre.

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ckW/kus dk izf" k{k.k fn;k tk;sxkk ftlls fdlku HkkbZ vius ns"kh csj dks iscanh esa rCnhy dj yssaxssa vkSj bls vkenuh feysxhA lewg&ppkZ ds nkSjku ;qokvksa] efgykvksa o d'kdksa us c<+&p<+ dj fgLlk fy;kA dk;Zdze esa xzke iqukoyhdyka rFkk Mksekxksj ds 35 xzkeh.k d'kd] ;qok rFkk efgykvksa us Hkkx fy;kA

ICAR-ICRAF AGROFORESTRY WORKSHOP

Dr. S. K. Dhyani, Director, Dr. V. K. Gupta, Pr. Scientist (Tree Breeding), Dr. O. P. Chaturvedi, Pr. Scientist (Agroforestry/Forestry), Dr. A. K. Handa, Sr. Scientist (Forestry) and Dr. R. V. Kumar, Sr. Scientist (Plant Breeding) participated in the ICAR-ICRAF Agroforestry Workplan Workshop on 19th - 20th April, 2008 at NASC Complex, D.P. Shastri Marg, Pusa Campus, New Delhi-110012.

ANNUAL GROUP MEETING OF ALL INDIA COORDINATED RESEARCH PROJECT ON AGROFORESTRY

Annual Group meeting of All India Coordinated Research Project on Agroforestry (AICRPAF) was held during 26th to 28th May, 2008 at BAU, Ranchi. Dr. S.K. Dhyani, Director & Coordinator of the project organized this group meeting. Dr. A. K. Singh, DDG (NRM), ICAR, New Delhi, was the Chief Guest and Dr. V.P. Singh, Regional Representative South Asia Centre of ICRAF was the special invitee in the meeting. Dr. N. N. Singh, Vice Chancellor, BAU, Ranchi inaugurated the meeting. Officer- in-charge and scientists from 25 SAUs and one ICAR institute participated in the group meeting. Dr. K. R. Solanki, Ex. ADG (AF), ICAR, New Delhi and Dr. P. Rai, Rtd. Pr. Scientist of the Centre were the special invitees of the meeting. Besides inaugural and plenary session eight technical sessions were held.

NEW EXTERNALLY FUNDED PROJECTS

S. No.	Title of Project	Principal Investigator	Associate
1	Network Project on "Harvest and Post Harvest Processing and Value Addition of Natural Resins, Gum and Gum Resins" Collaboration with IINRG, Ranchi	Dr. A. Venkatesh	Dr. Ajit, Dr. A.K. Handa Dr. R.S. Yadav, Dr. Ramesh Singh,
2	Sponsored Project on "Carbondioxide Sequestration Potential of Agroforestry System under Irrigated and Rainfed Conditions" Funded by Department of Science & Technology, New Delhi	Dr. Ram Newaj	Dr. Badre Alam, Dr. A. Venkatesh, Dr. R.S. Yadav, Dr. Ajit, Dr. .R.H. Rizvi,
3	Network Project on "Climate Change" Funded by ICAR, New Delhi	Dr. Ram Newaj	Dr. Badre Alam, Dr. A.K. Handa,

			Dr. Rajendra Prasad, Dr. Ajit, Dr. Ramesh Singh,
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fgUnh dk;Z' kkyk

fnukad 27-05-2008 dks dsUnz esa ,d fnolh; fgUnh dk;Z' kkyk dk vk;kstu Jh izse 'kadj feJ] mi izcU/kd&jktHkk"kk] iatkc us'kuy cSad] e.My dk;kZy;] >Wklh ds eq[; vkfrF; esa lEiUu gqvka Jh izse 'kadj feJ] mi izcU/kd&jktHkk"kk us viuk O;k[;ku ^^jktHkk"kk uhfr] fu;e ,oa izcU/ku** ij fn;kA mUgksus crk;k fd Hkkjr ds lafo/kku ds vuqPNsn 343 esa ;g O;oLFkk nh xbZ gS fd la?k dh jktHkk"kk fgUnh vkSj fyfi nsoukxjh gksxh vkSj la?k ds 'kkldh; izk;kstuksa ds fy, Hkkjrh; vadksa dk varjkZ"Vh; :Ik iz;ksx esa yk;k tk;sxkA mUgksus lafo/kku dh vkBoha vuqlwph esa fofufnZ"V Hkk"kkvksa ds ckjs esa foLrkj ls crk;kA jktHkk"kk vf/kfu;e 1963 ds ckjs esa crk;k fd bl vf/kfu;e dks 1967 esa la'kksf/kr fd;k x;k vkSj dqN fof'k"B dk;ksZ esa fgUnh ds lkFk&lkFk vaxzsth dk iz;ksx Hkh j[kk x;kA jktHkk"kk vf/kfu;e dh /kkjk 3(3) ds vuqlkj nLrkost vfuok;Zr% fgUnh vkSj vaxzsth esa ,d lkFk tkjh fd;s tk;sxssasA dsUnzh; ljdkj ds dk;kZy;ksa esa fgUnh fVIi.kh ds fy[ks tkus ds

ckjs esa crk;k fd deZpkjh fdlh Qkby ij fgUnh
esa fVii.kh fy[k ldrk gSA fgUnh dk dk;Zlk/kd
Kku izkIr deZpkjh fgUnh nLrkostksa ds vaxzsth
vuqokn dh ekax ugh dj ldrkA dk;Zdze dk lapkyu
Mk- vkj-oh- dqekj] ofj"B oSKkfud ,oa izHkkjh
vf/kdkjh fgUnh us fd;kA