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X-ray Astronomy School and Workshop on Broadband X-ray Spectroscopy with ASTROSAT

A well focussed school on X-ray Astronomy was conducted at IUCAA from February 02 to March 20, 2009. The main purpose of the school was to enable Ph. D. students from universities and their advisors to get a good command of X-ray data analysis techniques and the interpretation of the data. The school was divided into two parts. The first part, which ran for a week, had introductory lectures on X-ray astronomy during the first 3 days. The emphasis was on foundations of X-ray astronomy. In the next three days, technical lectures and data analysis sessions were organized. The first week of the school was designed to provide a broad exposure to X-ray astronomy and the associated data analysis techniques. Thirty participants from all over India, two from Egypt and one from Indonesia attended the school.

The second part of the school during the next six weeks was designed for some serious research work. A small group of participants and experienced researchers worked together on carefully chosen research projects. There were also a series of lectures, about one or two per day, on time series analysis, radiation and accretion processes, statistics, X-ray binaries, active galactic nuclei, etc. Twenty participants worked on projects under the supervision of experienced scientists from India and abroad. The main emphasis of the school was on teaching and learning by interaction, either on one-to-one basis or in small groups. Most of the participants have completed substantial part of their projects, and will continue working at their universities in collaboration with



Top: Participants and Lecturers of the X-ray Astronomy School
Below: Participants and Lecturers of the Workshop on Broadband X-ray Spectroscopy with ASTROSAT

project advisors.

There were 20 scientists from India and abroad who have delivered lectures, supervised projects and closely interacted with participants during the long school.

About midway through the school, a three day advanced workshop was organized on the topic "Broadband X-ray Spectroscopy with ASTROSAT" during February 23 - 25, 2009. In addition to the participants of the school, this workshop was attended by about a dozen experts from India and abroad. The spectral characteristics of the ASTROSAT instruments were discussed in detail and some of the key science areas to be addressed using broadband spectroscopy from ASTROSAT were highlighted. Extensive discussions were held on instrument details, science priorities, as well as the techniques and tools to be employed for spectroscopy with ASTROSAT.

Welcome to ...

Professor E.P.J. van den Heuvel, Astronomical Institute, University of Amsterdam, Netherlands, who has accepted our invitation to be an Honorary Fellow of IUCAA from February 2, 2009. A very warm welcome to Professor Heuvel into the extended IUCAA family.

Professor Ved Prakash, who took over as Vice-Chairman, University Grants Commission, from February 28, 2009.

... Farewell to

Professor Mool Chand Sharma, whose term as Vice-Chairman, University Grants Commission came to an end.

Congratulations to ...

S.K. Pandey, who has been a Visiting Associate of IUCAA right from the first batch in 1989, on being appointed as Vice-Chancellor of Pt. Ravishankar Shukla University, Raipur. In this, he follows his own teacher R.K. Thakur, who was also a Visiting Associate of IUCAA and was appointed as VC. Another Associate who achieved the same distinction was H.L. Duorah of Gauhati University.

Welcome to ...

Gauri V. Kulkarni, who has joined as a post-doctoral fellow (Project). Her areas of research are Statistics of the Large Scale Structure, and Cosmic Microwave Background.

Pasquier Noterdaeme, who has joined as a post-doctoral fellow. His areas of research are Quasar Absorption Lines, Interstellar Medium at High Redshift, and Molecules and Dust.

Bruce Cabral, who has joined as a junior research fellow (Project).

... Farewell to

Archana Bora, who has completed her tenure as a research scholar (Project) at IUCAA and joined at her parent institute, Gauhati University, Guwahati.

K.S.V.S. Narasimhan Prizes

K.S.V.S. Narasimhan, who is well-known for his contributions to the theoretical study of interactions between galaxies, and has been associated with IUCAA for many years, has very kindly made a donation of Rs. one lakh to IUCAA. This amount will be kept in fixed deposit and interest earned thereon every year will be used to give prizes to high school students from the region around the IUCAA Girawali Observatory (IGO), for excelling in competitions organized at the time of the National Science Day, which falls on February 28 every year. The prizes, which will be first given in 2010, will be named after K.S.V.S. Narasimhan, to whom IUCAA is grateful for the donation.

Workshop on Machine Learning Methods in Astronomy



Participants and Lecturers of the workshop on Machine Learning Methods in Astronomy

The IUCAA workshop on Machine Learning Methods in Astronomy was held at Mar Athanasios College for Advanced Studies (macfast.org), Tiruvalla, on the banks of the backwaters in Kerala State during January 19 – 23, 2009. Thirty-one selected researchers from various universities participated in the workshop. Excellent lectures covering topics from astronomy, bioinformatics and cosmology were included. The discussions and lectures were focused on Virtual Observatory and Data Mining Challenges in Astronomy that can be extended to other areas like bioinformatics or cosmology. In-depth analysis and use of different machine learning tools and methods such as Support Vector Machines, Perceptrons, Artificial Neural Networks, Gaussian Process Regression, Bayesian Neural Networks, Hidden Markov Models and various issues such as Anomaly Detection, Clustering of Streaming Data in Astronomy and Bioinformatics, Bayesian Inference for Cosmological Model Comparison Problems were some of the main topics discussed at the workshop. Besides, special sessions on Virtual Observatory and tools like VOStat, VOPlot were demonstrated. The workshop was inaugurated by Naresh Dadhich (Director, IUCAA) and the lectures were given by Ajit Kembhavi (IUCAA), Ashish Mahabal (Caltech), Asis Kumar Chattopadhyay (Calcutta University), Shirish Shevade (IISc, Bangalore), Giuseppe Longo (University of Napoli Federico II, Italy), Yogesh Wadadekar (NCRA), Vasudha Bhatnagar (Delhi University), Moncy V. John (St. Thomas College), and Ninan Sajeeth Philip (St. Thomas College). The objective of the workshop was to initiate interactions and research collaborations between isolated researchers in the country, so that more focussed and fruitful collaborations can be established. Apart from our own Chandrayaan mission, the many huge data archives such as SDSS, GOODS and new ones like LSST require lot of expertise in machine learning and data mining for its processing. The workshop was the first step in the direction to generate such expertise and awareness.

Public Outreach Telescopes

In order to provide students the opportunity to view the night sky through a bigger telescope, IUCAA has recently provided 6 inch refracting telescopes to IUCAA Reference Centres at Kochi, Raipur and Udaipur. These telescopes are f/8 Newtonian refractors with a sidereal clock drive, and can be easily transported from place to place. The telescopes will provide students, teachers as well as members of the public fascinating views of celestial objects. The IRCs will be conducting a number of public sky shows at various sites in their neighbourhood. Students will be able to undertake scientific and instrumentation projects using these telescopes.

THE MOON



This image was shot with a simple Sony 7.2 Megapixel camera, working in the automatic mode at the eyepiece (the eyepiece was not removed) of the 6 inch IRC-Kochi telescope, by Vivek M. Nijo Varghese, R. Tharanath and Sanish Sebastian, all research students of V. C. Kuriakose at Cochin University of Science and Technology, Kochi.

Inaugural Meeting on IYA 2009

Nationwide activities in India

IUCAA organized a half day inaugural meeting on nationwide activities in India in connection with the International Year of Astronomy 2009 (IYA 2009) on Saturday, January 10, 2009.

T. Padmanabhan, Chairman, INSA-IAU National Committee welcomed the delegates and summarized IYA related activities that would be carried out by various institutions in India. In particular he mentioned the role of NGOs such as Akashmitra of Pune or Academy of Physics Teachers (APT), Kochi, which have planned year long activities.

In his brief speech, Jayant Narlikar shared his personal views about what one might do to celebrate the IYA 2009. Firstly, he said that the historical background, not just of Galileo and his work, but also that of his contemporaries and others who contributed to the development of astronomy, such as Kepler and Newton, should be highlighted. He then said that though the simple sky watching programmes were important, the other scientific information about the astronomical objects must also be highlighted. The general public should be made aware of the technological innovations and achievements including those in application of software in astronomy.

Next, he pointed out that the study of asteroids and comets was quite important. He reminded the audience that the chance of threat to the life on earth due to collision of a comet could be, if detected early enough, be averted. He also talked about writing good science fiction stories and novels to take science of astronomy to general public. He then touched upon the importance of eradication of astrology from the mindset of people. He said giving rational arguments about why astrology was not a science could be an important IYA activity. He pointed out the importance of giving career guidance to the school students, particularly to those doing secondary and higher secondary. Last point on his list was what an astronomer should not do. He said that as a part of IYA activities, astronomy should be communicated in simple language to general public and highly technical talks should be avoided.

S. Seetha, scientist at ISRO said that their main thrust would be on space science and talked about various short term workshops that ISRO would be conducting for students.

Ranjan Gupta, Secretary, Astronomical Society of India (ASI) told that the members of ASI would give a series of lectures in places away from major cities.

S. Chattejee of Indian Institute of Astrophysics (IIA) told that in addition to various programmes being planned to celebrate the IYA, a tableau, highlighting the Indian astronomy, being built by IIA would participate in the Republic Day parade on January 26, this year.

Vinod Kamble, Director, Vigyan Prasar, told that they were working on 52 episodes radio serial and 26 episodes television serial on astronomy. The half-an-hour television programmes will be telecast on DD1 at 9 a.m. slot. He also told that the radio programmes would be translated into

several Indian languages and would be broadcast from more than 100 radio stations of AIR. Kamble also talked about making full use of the high curiosity of general public during the total solar eclipse on July 22, 2009. He also mentioned about Vigyan Prasar's efforts to popularize astronomy around this period.

Representing National Council for Science Museums (NCSM), A. S. Manekar, Director, Nehru Science Centre, Mumbai highlighted series of activities such as touring exhibitions, interactive exhibits, etc. that NCSM has been working on.

Aniket Sule of Homi Bhabha Centre for Science Education talked about the short one minute video clips that he was working on. These video clips could be used as fillers by TV channels. The clips are in the form of answers to frequently asked questions by the general public.

Piyush Pande, Director, Nehru Planetarium, Mumbai spoke on behalf of the planetariums in India. In particular, he highlighted programmes at Mumbai, Delhi and Nasik. He pointed out that taking astronomy to public was the mandate of planetariums. He also said that in addition to these programmes, there would be special lectures and demonstrations.

Pushpa Khare of Utkal University, Bhubaneswar spoke on behalf of IUCAA Associates from different Indian universities. She said that with the help of IUCAA staff, various universities would be conducting short programmes for school students, where the participants would make simple instruments such as telescopes and spectrometers, and public lectures by astronomers.

The last speaker was Ranjeev Misra who presented an account about IUCAA's plans to celebrate the IYA 2009. Misra is also the Single Point of Contact (SPoC) in India for the IYA 2009. He said that IUCAA's plans for celebrating the IYA included outreach to different parts of the country to conduct workshops and lectures. As SPoC, he appealed to every one that they inform him about the programmes conducted by various agencies. This will help him to consolidate his report at the end of the year.

In addition to the half day programme, IUCAA organized a series of lectures for the school and college students and for general public as follows:

- **Why Study Astronomy?** (J. V. Narlikar)
- **X-ray astronomy and ASTROSAT** (S. Seetha, Indian Space Research Organization, Bangalore)
- **Frontiers of Radio Astronomy** (Yashwant Gupta, National Centre for Radio Astrophysics, Pune)
- **Chandrayaan-1** - Public Lecture (P. Sreekumar, Head of Space Astronomy and Instrumentation at the ISRO Satellite Centre, Bangalore)

NATIONAL SCIENCE DAY CELEBRATIONS - 2009

As every year, the National Science Day was celebrated by having a special programme of Essay, Drawing and Quiz competitions and a lecture for the secondary school students and open day for the public.

The school student's programme was held on February 21, 2009.

A. S. Padmavathi of ISRO gave a lecture on Chandrayaan I and showed the first videos from the spacecraft data.

In competitions, IUCAA has always put a very high standard of judging and there have been occasions that either no prizes were given or only first or second prize was given. This year the standard of students was exceptionally high in all the three events.

Varun Sahni, who chaired the panel of judges for essay competition could not help but recommend two first and two second prizes in English essay competitions. Similarly, it was a narrow margin between first and second prizes in Marathi essay competitions. T. Padmanabhan chaired the panel of judges for drawing competitions and after much debate, the two drawings (given below) were selected for the first and second prizes and one prize was given as honourable mention.

The quiz programme was conducted by Gaurang Mahajan. Naresh Dadhich, Director, IUCAA gave away the prizes.

The list of winners in various categories is given in the adjoining box.

Results of various competitions

Quiz Competition

1st Prize: Jnana Prabodhini Prashala, represented by Aditya Sunil Joshi, Harshwardhan Prasad Jog, and Eeshan Gunesh Dhekane.

2nd Prize: Loyola High School, represented by Aakash Atul Kalwint, and Vinit Ravishankar.

3rd Prize (jointly) : St. Joseph's High School represented by Sanskriti Atul Dawle, Leena Hemant Damle, and Shreejita Pinaki Sengupta and Vidya Bhavan High School represented by Manish Suresh Advani, Vinit Kundan Gela, and Soham Rajesh Phade.

Essay (English)

1st Prize: Spruha Advait Kurlekar, Jnana Pabodhini Prashala, Pune and Rutuja Surve, St. Joseph High School.

2nd Prize: Abhiram P Bhalerao, Abhinava Vidyalaya High School and Asawari A Ambike, Jnana Pabodhini Prashala, Nigadi.

Essay (Marathi)

1st prize: Arati Ajai Bhattu, Jnana Pabodhini Prashala, Nigadi

2nd Prize: Sonal Mangesh Pawar, Huzurpaga School, Katraj.

Drawing

1st Prize: Manorama Londhe, Vidya Pratishthan's English Medium School.

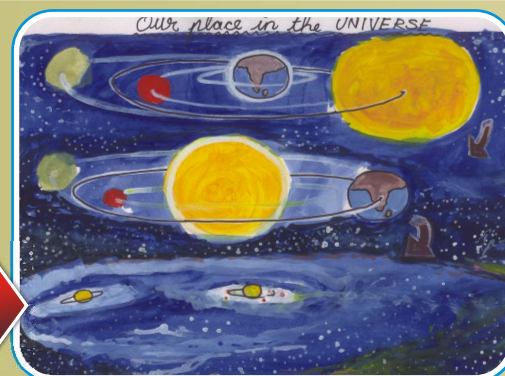
2nd Prize: Sameer P. Khare, Vidya Bhavan High School.

Honourable mention: Snehal Ingale, Kendriya Vidyalaya 2, AFS.



Manorama Londhe (1st Prize)
Vidya Pratishthan's English Medium School

Sameer P. Khare (2nd Prize)
Vidya Bhavan High School



Open Day at IUCAA

The Open Day for Public was observed on Saturday, February 28, 2009.

On this day there were many events, which ran continuously and concurrently.

In some parts of the Devayani complex, IUCAA academic members displayed the latest trends in astronomy and astrophysics research in a poster session. Many faculty members were present to answer questions. The instrumentation department displayed astronomy related instrumentation and demonstrations on astronomical seeing. Astronomy films were screened in Chandrasekhar Auditorium. In the foyer of Chandrasekhar Auditorium SciToys Demonstrations were arranged by the students of Loyola School. Deoyani Nandrekar gave demonstrations on Virtual Observatory and Hubble data analysis. On the grounds of Muktagan Vidnyan Shodhika (MVS), students of Loyola School gave demonstrations on water rocket, and Venus at its crescent phase was shown live.

Workshop on making of a simple CD/DVD spectroscope was conducted for the school students at MVS. Fergusson College students helped in making about 250 such spectroscopes.

A poster exhibition on Chandrayaan from ISRO was also arranged. IUCAA science park was kept open with volunteers to explain various exhibits.

Gulab Dewangan and Samir Dhurde gave short 30 minutes' talks titled "The Universe in X-rays", and "Galaxies" respectively. In a programme titled "Meet the Scientists and Ask Questions" Jayant Narlikar and T. Padmanabhan answered the questions asked by the audience.

Dear Members,

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<http://ojs.iucaa.ernet.in/index.php/KHAGOL/user/register>

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In case of any problem please contact [publ\[at\]iucaa.ernet.in](mailto:publ[at]iucaa.ernet.in)

IUCAA Preprints

Listed below are the IUCAA preprints released during January to March 2009. These can be obtained from the IUCAA library (library@iucaa.ernet.in). The preprints can also be freely downloaded from <http://www.iucaa.ernet.in/~library/main.html>

Ng Ibohal, Non-stationary de Sitter cosmological models, IUCAA-01/09; Arman Shafieloo and Tarun Souradeep, Assumptions of the primordial spectrum and cosmological parameter estimation, IUCAA-02/09; Tuhin Ghosh, Rajib Saha, Pankaj Jain and Tarun Souradeep, Model independent foreground power spectrum estimation using WMAP 5-year data, IUCAA-03/09; Naresh Dadhich, Why do we live in four dimension?, IUCAA-04/09; Nishant Mittal, Joginder Sharma, Vivek Tomar and Udit Narain, On distribution of CMEs speed in solar cycle 23, IUCAA-05/09; Nishant Mittal and Udit Narain, On some properties of coronal mass ejections in solar cycle 23, IUCAA-06/09; Deepak B. Vaidya and Ranjan Gupta, Composite grains: Effects of porosity and inclusions on the 10 um silicate feature, IUCAA-07/09; Ashim K. Roy, Subodh K. Sharma and Ranjan Gupta, A study of frequency and size distribution dependence of extinction for astronomical silicate and graphite grains, IUCAA-08/09; and Archana Bora, Ranjan Gupta, Harinder P. Singh and K. Duorah, Automated star-galaxy segregation using spectral and integrated band data for TAUVE/ASTROSAT satellite data pipeline, IUCAA-09/09

Seminars

Listed below are the seminars and colloquia given at IUCAA during January -March 2009.

05.01.2009 Varsha P. Kulkarni on In search of the galaxies producing quasar absorption lines; 06.01.2009 Atul Deep on Assist: The test set-up for VLT adaptive optics facility; 13.01.2009 Manjari Bagchi on Effect of three body stellar interactions on binary radio pulsars in globular clusters; 15.01.2009 Dhruvaditya Mitra on Turbulent dynamos in spherical domains: Some recent results; 05.02.2009 Chiranjib Konar on Radio galaxies, their environments and clusters of galaxies; 18.02.2009 Subodh Patil on Inflation with a stringy minimal length, redone; 19.02.2009 L. Sriramkumar on Can reheating affect large scale curvature perturbations?; 12.03.2009 Kailash C. Sahu on Limits from HST on substellar and planetary-mass objects through microlensing; 17.03.2009 S. Afsar Abbas On the crisis of the 3+1+1 forces and on the connection between geometry and physics; and 20.03.2009 Sharanya Sur on Origin and evolution of cosmic magnetic fields.

Colloquia

21.01.2009 Roy Maartens on Dark energy and dark gravity; 24.02.2009 Krish Bharutharam on Scientific research in South America and role of National Research Foundation; 03.03.2009 Sandip Pakvasa on Parity violation to Nobel 2008.

Telescope making workshops for school students

As a part of activities related to the International Year of Astronomy (IYA-2009), IUCAA has been conducting a number of telescope making workshops in various institutions, university departments and colleges in India. During these workshops, high school and college students make one-inch refracting telescopes using kits provided by IUCAA. Up to 20 telescopes are made by participants of each workshop, working in teams of two students each. These telescopes have been used successfully in observations, and it is very interesting that the views that students get through these telescopes are very similar to the observations made by Galileo that he had made himself 400 years ago.

Students at the Visvesvaraya National Institute of Technology (VNIT), Nagpur workshop had a wonderful view of the crescent of Venus in February this year, which was both exhilarating and surprising for them.

These workshops have been conducted at DDU Gorakhpur University; VNIT, Nagpur and Osmania University, Hyderabad. For the rest of the year, several more workshops have been planned. These will take place at IISER Kolkata, Utkal University, CUSAT, Kochi, North Bengal University, University of Kashmir, M. L. Sukhadia University, and others.



Some glimpses of IYA activities



Visitors Expected

April: Ashok Vajpeyi, Lalit Kala Akademi, Delhi; B.R.S. Babu, University of Calicut; Sergey Chervon, Ulyanovsk State University; Sukanta Dutta, University of Delhi; K. Jeena, University of Calicut; V. Jitesh University of Calicut; Kala Janan, M.G. University, Kottayam; Nimmy Jayesh, M.G. University, Kottayam; Sanatan Nath, North Bengal University; Vineet Yadav, D.D.U. Gorakhpur University; Asoke Sen, Assam University, Silchar; and Aruna Goswami, IIA, Bangalore

May: Samarpita Bhattacharya, Bengal Engg. & Science University, Howrah; Ritabrata Biswas, Jadavpur University, Kolkata; Surajit Chattopadhyay, Pailan College of Mgmt & Tech., W. Bengal; Ujjal Debnath, Bengal Engg. & Science University, Howrah; Jibitesh Dutta, St. Edmund's College, Shillong; K.P. Harikrishnan, The Cochin College, Kochi; Sarbari Guha, St. Xavier's College, Kolkata; Kanti Jotania, M.S. University of Baroda; Ashwini Kale, St. Vincent Pallotti College of Engg. & Tech., Nagpur; Pushpa Khare, Utkal University, Bhubaneswar; B.K. Kumthekar, SRTM University, Nanded; Naiwita Mazumdar, Jadavpur University, Kolkata; Ganpat Dak Patil, SRTM University, Nanded; Anvar Shukurov, University of Newcastle, UK; G.P. Singh, VNIT, Nagpur; P.K. Srivastava, DAV (PG) College, Kanpur; Jitesh Tripath, VNIT, Nagpur; and A.A. Usmani, Aligarh Muslim University; and K.D. Patil, B.D. College of Engineering, Wardha.

June: Rizwan Ansari, University of Hyderabad; Deepak Jain, University of Delhi; Sanjay Jhingan, Jamia Millia Islamia, New Delhi; Saibal Ray, Govt. College of Engg. and Ceramic Tech., Kolkata; Subharthi Ray, University of KwaZulu-Natal, South Africa; Biplab Raychaudhuri, Surya Sen Mahavidyalaya, Siliguri; and M. Sivakumar, University of Hyderabad.

Congratulations to ...

Ajit Kembhavi, on being elected a Fellow of the Indian Academy of Sciences, Bangalore.

Mudit K. Srivastava and A. N. Ramaprakash, on being awarded the Best Poster Award in Instrumentation Discipline, at the 27th Annual Meeting of the Astronomical Society of India, held at the IIA, Bangalore during February 18 - 20, 2009.

Visitors (January - March 2009)

Varsha Kulkarni, Saket Kaurav, Atul Deep, Ng. Ibohal, Ng. Ishwarchandra, Rabin Chhetri, S.M. Chitre, S.N. Hasan, Priya Hasan, Samten Tamang, Abiral Tamang, Manjari Bagchi, Udit Narain, Nishant Mittal, Pooja Gupta, Sukanta Deb, Shailesh Kulkarni, D.B. Vaidya, Dhruvaditya Mitra, Karen Haydock, K. Sriram, Ravi Kiran, Atish Kamble, S.K. Pandey, S. Mukherjee, B.C. Paul, V.C. Kuriakose, N. Mukunda, N. Banerjee, T.R. Seshadri, G. Longo, Ravi Subrahmanyam, Praveer Asthana, B. Eswara Reddy, Ram Sagar, Atul Gurtu, Siraj Hasan, A.K. Saxena, R. Raghavendra Prasad, Gamal Edin Hamed, R.S. Tikekar, Ashish Mahabal, M.A. Malik, L. Sriramkumar, Dhiraj Kumar Hazra, Subodh Patil, A.S. Padmavathy, N. Udaya Shankar, Rekhesh Mohan, V. Vinu, Krish Bharuth Ram, Laxmikant Chaware, Robert Botet, Shashi Bhushan Pandey, Sanjay Sarwe, Ashok Pati, Nidhi Jain, Moti Ram Dugair, H. Tagoshi, S. Pakvasa, Afsar Abbas, Nidhi Joshi, Kailash Sahu, Nijo Varghese, M. Vivek, Shiv Sethi, and Navin Chandra.

The inaugural meeting of the IYA was attended by about 50 people from various universities and institutes. About 50 participants attended the X-Ray Astronomy School (February 2 – March 20) and the Workshop on Broadband X-ray Spectroscopy with ASTROSAT (February 23 – 25).

Know Thy Trees - 13

SITA ASOKA (*Saraca Indica*)

Arvind Gupta and
Arvind Paranjpye

There are two good specimen of this tree in the lawn opposite the Chandrasekhar Auditorium in IUCAA.

The Sita Asoka is very different from the tall Asoka trees usually planted along avenues. This slow-growing, evergreen tree with a smooth, grey-brown bark is indigenous to India. The crown is compact and shapely. The Ixora-like flowers are usually seen throughout the year, but it is from February to May that the profusion of orange and scarlet flower clusters turns the tree into an object of startling beauty. The flowers slowly change colours turning from yellow to orange to crimson due to the effect of the sun rays. They acquire a delicate perfume after sunset. The tree has several medical uses; its bark is used for women's ailments and flowers for treating dysentery.

It is believed that Buddha was born under the Asoka tree. Sita, wife of Rama, when abducted by the evil Ravana, was kept in a garden among groves of Asoka trees. Both Buddhists and Hindus consider the tree sacred.



Green Finger : Suma Chitnis (December 29, 1996)

Khagol (the Celestial Sphere) is the quarterly bulletin of IUCAA

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