Wildlife Sanctuary (WLS). This wildlife sanctuary is cut off from nearby protected areas and has less popularity compared to the Tadoba or Pench in the State. The tranquil surroundings in the area and the vibrant wildlife in the forests rejuvenated us. The DCF, V.S. Bardekar pointed out to us the immense potential of Nagzira WLS to develop tourism in the area. Protection and sensitivity to the requirements of the people residing on the fringes of the protected area have ensured the successful preservation of the habitat for wildlife. It was heartening to hear from Ajai Pilari Seth, ACF of the park that the medicinal plant conservation area in the park is being maintained through a tribal co-operative society where the indigenous knowledge of the locals was being harnessed in conservation. The discussions at Nagpur with Shri Bhagwan, CF added a delightful change to the tour at this juncture.

The team proceeded to Pune by road and was exposed to a different situation and an entirely new problem, which is being successfully tackled. The Junnar Forest Division near Pune, had witnessed a spate of human casualties in the recent past by leopard attacks that was a matter of grave concern and also attracted the media attention. When we first met Mr. Khadse, DCF, he surprised us by his composed nature and showed no sign of alarm at the grave situation. When our tour proceeded we realized his staff was dealing with the conflicts with leopard in a professional manner. During the execution of the measures, empathy towards the villagers was at the fore and this left no scope for adverse publicity. Our visit to the villages and talks with villagers were heartrending. It can be an unnerving experience to live in a place, where one knows that there is a stealthy and intelligent predator lurching in the sugarcane fields all around. It is not an easy task to console such traumatized people and obtain their wholehearted support in capturing the animals from time to time. We were left with the impression that the integration of the entire department was key in containing this problem and saving the leopard from wanton persecution. The effort that is being made by the forest department is commendable in spite of the meager financial support to carry out capture operations.

In Pune, we were introduced to Pramod Nargolkar, Honorary Wildlife Warden, an eminent Industrialist and a passionate nature lover. It was 19th October, the tour was inching towards its final stages and signs of weariness were creeping into our students, but the visit to his farm in the outskirts of Pune, turned out to be an invigorating one. Nargolkar's farmland has been transformed into an arboretum with more than 300 species of plants from all over the world, and was being tended by his own resources. The arboretum also functions as an oasis for birds, snakes and many other animals in a denuded landscape where they seek refuge and even breed. It served as an eye opener to all of us on the important role played by an enterprising individuals such as Nargolkar in promoting restoration of habitat for wildlife conservation.

The tour was successful and it left behind in us indelible memories of the beautiful forests in Maharashtra State, and taught us the "practice" of wildlife conservation in a way which no text book or speaker can match. The *positive experiences* in enabling wildlife conservation that were gained right through the trip from government, non-government agencies and individuals left us with a strong feeling of hope, in achieving success in conservation programs in our country.

The Bir Moti Bagh Wildlife Sanctuary: Home of Hog Deer in Semi-arid Zone!!

K. Sivakumar

The Hog Deer *Axis porcinus* can be seen in various parks of India like Corbett, Manas, Dudhwa, and Kazirangha. All these protected areas have good grass meadows with perennial water resources. However, sighting this species in semi-arid zone is very special and interesting. It was a very hot and humid day when I visited the Bir Moti Bagh Wildlife Sanctuary on 3 July 2002. In Punjab, the Bir Moti Bagh is one of the important protected area because of its proximity to historical Patiala town and also it remained an important hunting ground of Maharaja of Patiala. In olden days the forest had a scanty growth of few trees which mainly comprised of bushes and scrub growth. After 1958 there was a regular programme of raising exotic species. Plantation in this forest had drastically changed the vegetation communities. Now, this forest is filled with few selected species such *as Eucalyptus hybrid* and *Prosopis juliflora*. These exotic species have converted all the grass meadows into barren ground, thus clearly demonstrating the harmful effects of noisy exotics. History also said that the Maharaja of Patiala introduced the German Wild Pig and Red Jungle Fowl in this forest for recreation. Apart from this, the wildlife department also introduced black buck and spotted deer here. All these introduced species were sighted in this sanctuary in very small numbers. However, history does not mention whether a small population of hog deer which is present in this forest was either introduced or not.

The hog deer is one of the most primitive true deer and occurrs in east-western part of this sanctuary. The term 'hog deer' is derived from this deer's habit of running through the forest with its head held low, ducking under obstacles in the manner of a wild pig, rather than leaping over them like most deer. They mainly feed on grass, which is why they are mostly spotted in grasslands across the plains and foothills of northern India. During the rut, males gather in open meadows, pawing the ground during antagonistic encounters. However, it is not possible in Bir Moti Bagh because there is no open grass meadow available here. All the grass patches were infested with *P. juliflora* and *E. hybrid*. Studies from other parts of India show that the population densities may be as low as 0.1 animals per square kilometer in riverine valleys, rising to over 19 individuals per square kilometer in grassy floodplains. But in Bir Moti Bagh, the total population of this species was not more than 10 individuals that too they are restricted to small portion of the park.

Punjab Forest Department is interested in reintroducing some of the deer species into this park so that this protected area can entertain the people of Punjab towards nature education. It may not be an easy task to do so because some of the compartments in this park need to be converted into grass meadows. Secondly, water should be made available in the park throughout year. The 150 odd stray cattle inside the park

should be relocated and the fencing around the park should be strengthened. Some of these measures may make sure that the Bir Moti Bagh sanctuary will be one of the homes of hog deer along with other wildlife.

Wildlife Forensic DNA Facility: A new initiative of Wildlife Institute of India

Reeta Sharma and S.P. Goyal

The Wildlife Forensic Facility at Wildlife Institute of India has initiated the work of identifying wildlife species from various parts and products received under wildlife offence cases and provide support to the enforcement agencies for proper implementation of Indian Wildlife (Protection) Act 1972. Under WII-USFWS project of five years, major emphasis was for identification of species based on morphometry techniques and four manuals are in the process of finalization viz "Identification of species from hair" "Characterization of species from canines" "Identification of species from claws and beaks" and Tibetan antelope-Trade and Wildlife Forensic techniques for identifying Shahtoosh hair

Wildlife Forensic DNA Facility at WII

Over the years the number of meat related cases have increased and it was really crucial to identify the species from such type of unknown degraded meat samples. Initially, we used double diffusion method to identify unknown samples up to the family level by treating the meat extract as antigen but this method has its own limitation as most of the commercially available antisera are of domestic species and wildlife species specific antisera are not available.

Then we switched over to other techniques, such as creating species specific protein profile using techniques like Sodium Dodecyl Sulphate (SDS) and Isoelectric Focussing (IEF). We even studied some enzymes like Phosphoglucomutase (PGM) and Creatinine kinase (CK), which are very useful for species identification from cooked meat cases. The major problem which we encountered with these technique was most of our samples are degraded and putrefied precluded to use are difficult protein profiles.

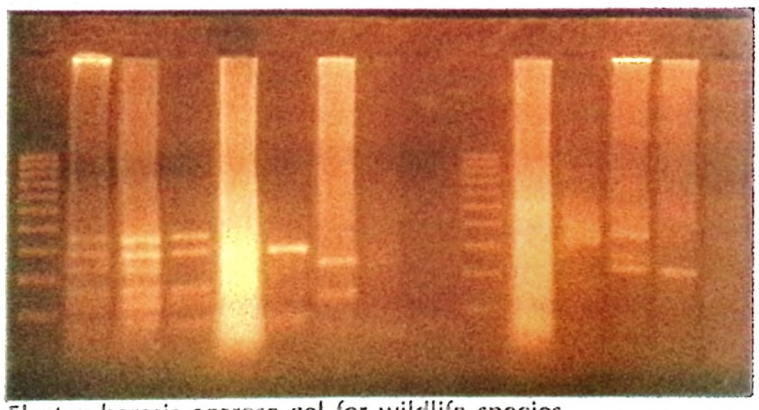
In developing countries like India, due to lack of awareness among the enforcement officials for proper preservation of biological samples, most of the offence cases related to meat which comes to us are preserved in various forms like, formalin, saline etc and are not possible to identify based on protein profiles. In order to overcome this problem, we came up with a manual for proper preservation of meat samples viz."A field guide for collecting tissue samples for Wildlife Forensic analysis"

Now, to deal with such type of pending cases (approx. 150) containing degraded biological parts and products for identification of the wildlife species, it has been decided to establish Wildlife Forensic DNA Facility to standardize techniques for identifying species. Deoxyribonucleic acid (DNA) molecule is a stable, duplex molecule which is responsible for individual hereditary trait and any sample can be identified using DNA based technique as this molecule is unique for every species and have been widely used in developed countries for identifying species. There are two ways of using DNA based techniques to deal such cases by working with either genomic or mitochondrial DNA. The use of mitochondrial DNA compare to genomic DNA is more popular and proved very useful for dealing wildlife offence cases because of the following two facts: (1) mitochondrial DNA is present in high copy number in a cell and (2) it exhibits an evolutionary rate 5-10 times higher than single copy nuclear genes.

Another important task while dealing wildlife forensic cases is to have a good Reference Sample Repository in order to compare with meat sample of unknown origin. At present we have collected tissue samples of 95 species in collaboration with zoos at Delhi, Kanpur, Mysore and Chennai and which are stored at –60°C.

Over the years WII has received more than 150 cases related to meat and several parts and products like blood, blood stains, tanned skin, hairs, antler, rhino horn, musk pod, bear bile, ivory which are only possible to identify using DNA based techniques and R&D is required to extract DNA from each type.

The major problem in dealing Wildlife forensic cases is the nature of the samples and mostly they are of degraded quality, thus it is a challenging task for us to extract the good quality DNA out of it and it requires a lot of standardization and R&D work. We have tried various protocols to extract good quality DNA



Electrophoresis agarose gel for wildlife species