BARK-EATING KOALAS in SENSW

KOALA SURVEYS BY THE AUSTRALIAN KOALA FOUNDATION

Koala surveys in the Chakola area

In November 2001 the Australian Koala Foundation (AKF) conducted targeted surveys for the Koala (*Phascolarctos cinereus*) in the Southern Tablelands and Southern Highlands regions. The objective of these surveys was to supplement the limited knowledge (Phillips 2000) of koala browse preferences in this part of NSW.

Areas selected for surveys were generally those where anecdotal information suggested that koalas were still surviving. One of these was a 2.500 ha forested property in the Chakola region, north east of Cooma. (Map 1). The owners of this property had observed that the bark of many eucalypts, particularly that of Brittle Gum, *E. mannifera*, was being "chewed". Several trees were being "chewed" repeatedly over many years, such that much of the bark of these trees was being removed in patches up much of the bole of the tree (Figure 1). The owners concluded that koalas were doing this. This was because scratchmarks consistent with those made by koalas were often present on the bole of the trees and koala scats were often present on the ground below. The owners had been observing this since purchasing the property in 199?.

On the 8th November 2001 the owners showed the AKF survey team a tree that had been extensively chewed and where a large number of koala fecal pellets were seen in **Date?**. A radial plot was established and a search for koala fecal pellets was undertaken under the trees in the plot using the methods described in Phillips and Callaghan (2001?). Only pellets deposited by the Common Brushtail possum (*Trichosurus caninus*) were located at this site.

The survey team conducted a sweep search for koala fecal pellets and another tree that had been chewed was located. Koala fecal pellets were found under this tree. Koala fecal pellets deposited by a joey were found in the fork of a nearby tree, the bark of which had also been chewed. Another tree nearby with chewed bark was found xxxm away, again with koala fecal pellets underneath.

The following day the owners showed us another tree that had been extensively chewed. This was approximately 3? kilometers from the area where the survey of the 8th November was undertaken. Fecal pellets deposited by an adult koala and joey were located in the fork this tree. Koala fecal pellets of differing ages were located nearby.

The survey team then conducted a sweep search for koala fecal pellets in the area between this location and that where the surveys had been conducted the previous day. Several sites with koala fecal pellets were located in this search, including fresh pellets deposited by an adult koala and joey. Another tree that had been extensively chewed was located in this search and koala pellets were located under this tree (Check).

The survey team closely examined the scratchmarks on the boles of the trees that had evidence of chewing. These appeared to be consistent with those made by koalas.

Some members of the koala survey team undertaking this work are experienced koala researchers. All were convinced that the evidence they encountered that is described above strongly suggested that koalas were responsible for the bark-chewing that was occurring on this property.

A summary of observations
In summary the owners and the survey team made the following observations:
1. There were several trees on the property the bark of which had been extensively chewed. It appeared that one or more koalas was repeatedly visiting each of these trees and that these were clearly being used in preference to others.
2. There were many other trees that were being chewed. Often the chew-marks were only at a particular height; approximately 50cm above ground level. From this it appeared that the koalas were nibbling at the bark of many of the trees without climbing them.
3. The chew-marks were usually approximately 5mm deep. It appeared that the koalas were eating into the cambium layers of the trees.
4. As yet it has not been possible to ascertain whether the consumption of bark occurs during a particular season. The fact that a large number of koala fecal pellets were observed in (date) at one site whereas by November 2001 there were none, suggests that this may be the case.
5. Appears to be a high rate of pellet decomposition on the property.

Pellet analysis
Pellet and bark samples were collected from these sites. Their contents were analysed with the following results:

KOALA HABITAT IN THE CHAKOLA AREA
Tree species
Little disturbance
No fire
Rainfall; dry compared with escarpment forests
Generally skeletal soils, suggesting low nutrient levels in foliage.

THE ECOLOGY OF THE KOALA IN THE SOUTHERN TABLELANDS
Surveys in the Numerella area.
Little is known about the ecology of the Koala in the Southern Tablelands (Phillips 2000).

Allen (1999) reported the results of a survey for koalas in the Numerella area approximately 30 kilometers to the South of the Chakola area. Although the data were too limited to draw anything but tentative conclusions, the Koalas in Numerella appear to have low activity levels at active sites. These can be measured by assessing the number of trees of each species with Koala faecal pellets compared with those without, and are known as "strike rates" (Phillips and Callaghan 2001). Of the more frequently sampled trees *E. rossi* had a strike rate of 0.16; *E. viminalis* was 0.13; and *E dives* was 0.08. These strike rates were slightly lower those found in Murrah/Bermagui Forest in SENSW where those from the primary dataset varied from 0.214 for *E. longifolia* to 0.080 for *E. tricarpa* (South East Forests Conservation Council 1998). These latter strike rates were lower that any encountered by the Australian Koala Foundation (Phillips pers. comm.)

Allen (1999) concluded that there was an important population of koalas in the Numerella and nearby areas. This was because:
- Evidence of koalas was found at all eight areas searched in this survey and that they appeared to be occupying at least some of these areas permanently;
- Extensive anecdotal information of koalas in the general area existed; and,
- At least one species of insect is present in the area that has evolved to utilise koala faecal pellets.

Allen (1999) also suggested that the Numerella koala population spread at least from the

Numerella/Countegany Road southwards for approximately 15 and that there was evidence suggests that there is a low density Koala population stretching from north to south for at least 50 km (Map 1). The rugged terrain, the scattered nature of the active sites in most areas searched, and the low activity levels at almost all of the active sites assessed, all suggest that breeding associations are small and widely scattered. He suggested that the population has probably survived in this area because in recent decades the level of disturbance encountered by these Koalas, including intensive logging, appears to be lower than that experienced by any other known population in SENSW.

Surveys in nearby areas undertaken by the Australian Koala Foundation

Surveys were undertaken in the area west of Numerella Mountain, near to where koala surveys were undertaken in 1999 (Allen 1999). Koala fecal pellets were located at a number of sites. This included those of an adult koala and joey at one site, indicating that a breeding association survives in this part of the region.

Surveys were also undertaken in the Hangmans Creek area. Again, koala fecal pellets were located at many sites, including those of an adult koala and joey at one site. This confirms that there is a breeding association between the Numerella and Chakola areas and gives added support to the suggestion in Allen (1999) that there is a koala population stretching from the Numerella to the Chakola areas.

The importance for koalas of *E. rossi* became clear in the survey of this area. The survey commenced in forest where *E. mannifera* and *E. machoryncha* predominated and *E. rossi* was not present. Only one active site was located in this area on only a few koala pellets were found at this site. The survey team then moved into an area where the latter species was common. Koala fecal pellets were then frequently encountered.

DISCUSSION

How extensive is the bark-chewing?

Although the koala population appears to be spread over a relatively large part of this region the AFK survey team was unable to ascertain how far the bark-chewing phenomenon extends. No conclusive evidence of this was located either in the Numerella or Hangman's Creek areas. However, the fact that the bark-eating has been ongoing for at least xx years and is distributed over and area of at least xxx ha indicates that there are at least several koalas doing this, probably including females and joeys.

The cambium: a diet supplement for koalas?

Until now it has been universally assumed that the Koala is an obligate folivore, feeding exclusively on foliage, predominantly that of eucalypts. The information presented above suggests that this perception will need to be revised.

There is a substantial cline in the morphological characteristics of the koala over its range (Martin and Handasyde 1991) and the species has evolved to utilise a wide range of forest and woodland ecosystems across eastern Australia (Norton and Allen submitted). It perhaps is therefore not surprising that koalas have evolved to utilise another part of the tree in its diet.

Under the bark is the xylem, which conducts water and mineral salts to the leaves, and the phloem which conducts sugars and ? back down to the roots. This is a system of vascular tissue, continuous throughout the plant body, concerned with the translocation of synthesised materials. Composed of sieve tubes, supporting and protective fibres and sclereids, and parenchyma functioning for storage and (when secondary) for the initiation of periderm. Internal phloem:

phloem when occurring on the inner side of xylem as distinct from external phloem when external to the xylem.