A METHOD OF ATTACHING RADIO TRANSMITTERS TO DESERT MONITORS, *VARANUS GRISEUS* IN ZARANIK PROTECTED AREA, NORTH SINAI, EGYPT

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Radiotelemetry has afforded a conclusive method for studying several aspects of ecology. Monitors have been equipped with transmitters by various methods; externally to the pelvic region (Green and King, 1978; Stanner and Mendelssohn, 1987), and on the tail (Weavers, 1993; Phillips, 1995; Thompson, 1992, 1994, 1995). Transmitters with attached antennae were implanted in the body cavity (Stebbins and Barwick, 1968; Weatherhead and Anderka 1984), with the aerial under the skin of the tail (Christian and Weavers, 1994), and under skin folds of the lateral side of abdominal wall (Thompson *et al,* 1999). Reinert and Cundall (1982) illustrated a technique in which the transmitter is deposited into the posterior coelomic cavity of snakes and the whip antenna is escalated through the body wall and is implanted subcutaneously. They claimed that their technique bypasses the problem of post-ingestion behaviour, as well as the perpetual complexity of regurgitation or defecation of the ingested transmitter elements. Wang and Adolph (1995) examined the effect of transmitter implantation surgery on behavioural thermoregulation in the western fence lizard, *Sceloporus occidentalis.* They found a small but potential effect on behavioural thermoregulation for the first two days after surgery. This effect was short-lived and vanished by the third day after surgery. In this study, temperature sensitive transmitters were embedded subcutaneously and their whips were externally attached. The same type of transmitters were previously implanted under skin in snakes and both the snakes and transmitters behaved normally (Ibrahim *et al.,* 1998).

Five healthy, *Varanus griseus* (snout to vent length 30.2- 36.0 cm; tail length 39.7-44.8 cm, and mass 295- 455 g) were captured in the Zaranik protected area in North Sinai, Egypt (31° 07 - 02 N, and 33° 25 - 52E) for studying their home range, movements and activity from 14 July 1997 to 30 June 1998.

SI-2T temperature sensitive transmitters with a whip antenna (24 cm standard nylon coated stainless steel wire) (Holohil Systems Ltd, Canada) were used. The transmitter is cylindrical, its body length is 35 mm, and the diameter of its base is 9 mm. It weighs eight g and is operated by a lithium battery with a life of about 14 months at 20°C. Transmitter signals were detected with a RX-1000 portable radiotelemetry receiver with a three element – Yagi Antenna (Wildlife Materials Inc., USA).

Prior to implantation, monitors were placed in cloth bags, and cooled in the fridge at 3°C for 3-4 hours. This hypothermic anaesthesia rendered the monitor to be moderately motionless. Implantation was initiated by making a horizontal 10-15 mm incision in the skin, at the left aspect of abdomen wall, about one cm anterior to the left hind limb using a Bard scalpel (Becton Dickinson Acute Care, USA). Little connective tissue was found between the dermis and the muscular layer, therefore no tissues were removed.

Another incision (about 10 mm) was made in the muscular layer immediately below the first incision. This incision was made about 3 mm deep, but not reaching the body cavity. Transmitter was inserted with the thumb in the incision starting with its base, then the whole body of the transmitter was interjected by rotating and pushing it with thumb and fore finger, thus enlarging the hole slightly, and leaving the long antenna outside of the body. When the transmitter was deposited in the muscular layer, the incision was closed by 3 to 4 sutures. Thus, the transmitter was held in place and kept off from moving. Five to six sutures were used to close the outer incision, sealing the skin and leaving no space around the antenna wire. Incision sites were cleaned with iodine solution and 70% ethyl alcohol. Sterile gloves, and sterilized surgical equipment were also used. The antenna was then traversed over the left thigh, positioned along the mid-dorsal line of the tail, and taped there by a strong heat resistant (up to 80°C) plastic tape (Manco, Inc., USA) to the tip of the antenna. Fixing antenna in both positions in the skin and on the tail resulted in creating untaped bridge-like part of the antenna. This position kept the antenna from moving and hence, kept the sutured hole from being enlarged.

Wounds healed within four to five days, and the monitors were released into the wild. Each monitor appeared to have normal behaviour and were monitored for one year. The monitors maintained a home range size up to 22.8 ha, but one male moved about 8 km in two months following its release, and crossed two marshes of high salinity; another increased its body mass by 480g during the year. High air temperature, rocky terrain, and lizard movements, resulted in some of the attachment tapes holding the antenna in place coming loose a few weeks before the end of study (one year). These lizards were not recaptured to replace the tape because their movements and the transmitter signal appeared to be normal. At the end of the study, it was noted that the wounds were completely dry, and the antenna was firmly fixed. To get the transmitters out, monitors were cooled in the fridge again as before, and the same incisions were reopened. Incisions were sutured back again. and the monitors were released into the wild.

This method of attaching temperature-sensitive transmitters with whip antenna may avoid problems associated with the placement of transmitters in the stomach, or in the coelomic cavity. The taping of the antenna along the mid-line of the dorsal surface of the tail seemed to function well for signal detection.

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LETTER TO THE EDITOR

Dear Editor:

I am writing to express my concern about an article published in the Spring 2000 Bulletin by Adel A. Ibrahim, concerning work in Egypt with Desert Monitors (*Varanus griseus*). The author described the use of hypothermia (cooled in the fridge at 3°C for 3-4 hours) as anaesthesia and used this method of physical immobilisation to carry out surgical procedures on his subjects.

The use of hypothermia for painful procedures in reptiles has been condemned for many years (Cooper & Jackson, 1981) and in some countries of the world employing this technique could lay one open to prosecution under animal welfare legislation. Britain, in particular, has played a leading part in promoting the use of proper chemical anaesthetic agents for reptiles and in ensuring that inhumane techniques, such as hypothermia, are not employed (UFAW/WSPA, 1989).

Having lived in Africa for some years and currently working on reptiles with colleagues in Uganda, I am conscious of the difficulties that often face scientists there and elsewhere, especially when developing research procedures or wanting to obtain equipment. However, the successful use of injectable or inhalation anaesthetic agents in monitors and other species of reptile is well documented (Beynon et al., 1992; Frye, 1991; Mader, 1996) and such techniques are used routinely elsewhere in much of Africa and the Middle East.

I am concerned that the BHS has published this article, apparently without first consulting members of the Society or others who might have been able to advise as to the acceptability of the techniques. The net result could be that other scientists may be encouraged to use similar methods. It saddens me, as a long-standing member of the BHS, that our Society should appear to endorse a method of immobilising reptiles for surgery that would be totally unacceptable in much of the world and which is so out of keeping with the modern technology and good scientific method described elsewhere in the same paper.

I should add that I would be happy to advise the author of the article in question on preferred methods of anaesthesia if this would assist his work. So too, I am sure, would other veterinary colleagues who are members of the BHS.

Yours sincerely,

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Editor's comment: the current Editor is unaware of the circumstances surrounding the publication of this article, but by way of reassurance to Prof. Cooper and the Society at large it is now routine practice for articles containing issues of a veterinary or welfare nature to be assessed by at least one professionally qualified referee. Prof. Cooper's offer to assist in this respect is gratefully acknowledged.