

PERIMETER AND ENCLOSURE FENCES

LOCATION: National Wildlife Research Center, Taif, Saudi Arabia.

TARGET ANIMALS: Various - cats, foxes, dogs, large browsers, ostriches

BRIEF DESCRIPTION: Five different designs - see below.

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There are five types of fences used at the NWRC for two main purposes: (1) to exclude predators, and (2) to facilitate management of captive birds and mammals.

1. The perimeter of the NWRC is fenced with chainlink overlaid with chicken mesh, and topped with three electrified wires (Fig. 1). It effectively excludes domestic stock and predators such as feral cats (*Felis catus*), dogs (*Canis familiaris*) and foxes (*Vulpes vulpes*). The size of the mesh (40 x 40 x 4 mm) is small enough to prevent entry by all potentially dangerous animals (cats, foxes, large lizards). Total fence height is 3.5 m, with 1 m sunk into the ground. One upright has been placed every 3 m. This type of fencing is expensive, with costs of materials and installation at about 100 SR [\$50NZ] per linear metre.

2. The construction of the houbara (*Chlamydotis undulata*) breeding pens is designed more to safely contain the houbara, which are nervous fragile birds, than to prevent other small animals from entering. Medium-sized reptiles are excluded from breeding pens containing eggs and chicks by attaching chicken mesh to chainlink fencing, and sinking it 50 cm into the ground. In larger non-breeding pens chicken mesh is used against ringlock fencing up to a height of about 2 m, but this does not exclude reptiles. Tildernet (shade-cloth) is attached to all pens as a wind break. The main problem is that the chicken mesh rusts after a few years of use, even if it is galvanised. This is also expensive, at 50 SR per square metre.

However, the primary cause of death of houbara in the pens is from physical trauma, indicating that the construction of the cages is inappropriate for their needs. There are too many solid objects: low concrete walls separating pens, exposed uprights, and the fencing material is too rigid. Ideally cages for birds such as these should be made of tildernet (shadecloth) slung from uprights positioned outside the pens, and tensioned to yield on impact. This design would be more flexible in setting up observational studies, and probably also assist in the control of pathological disease introduced into the breeding flock by contact with other species of birds (e.g., avian poxvirus from sparrows *Passer domesticus*), insects and possibly some rodents.

3. Fences enclosing large animals (oryx *Oryx leucoryx*, onagers *Equus hemionus*, ostriches *Struthio camelus*, ibex *Capra ibex nubiana*) are constructed from ringlock 13-

190-30 (Fig. 2). This has been effective, except that nodes are sometimes broken by the animals (blows by horns or legs). Ringlock fences of 1.90 m height are used for all animals except ibex: for this species a height of 2.8 m is required to prevent them from jumping over the fence. One upright is placed every 6 m, although in the case of ostriches it has been necessary to place a pipe set in concrete every 3 m.

However, ringlock fencing is not ideal for enclosing ostriches, as the mesh size is large enough that they can insert their feet through the mesh. Ostriches running alongside the fence (e.g. after darting) may become entangled. Ideally ostriches should be provided with a visual barrier of small mesh size, such as chainlink. A further disadvantage of ringlock fencing is that its low visibility means that several species of wild birds fly into it, especially at night, resulting in broken wings. Cost is 30 SR per linear metre.

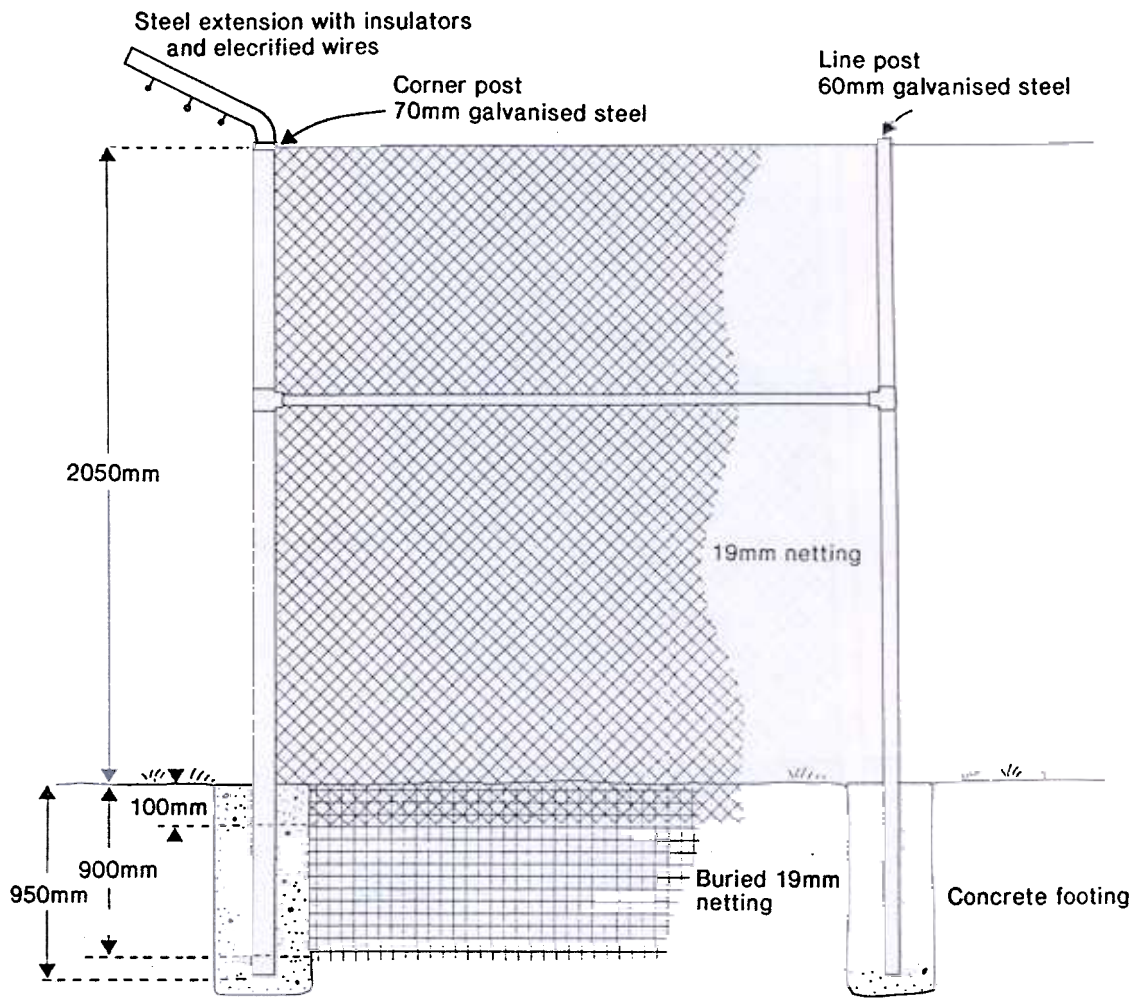
It also should be mentioned that while ringlock fencing has been successful in safely containing large ungulates at the NWRC, it is not always safe for humans. Oryx and ibex can thrust their horns through the fence, injuring staff standing close to the fence. In fact oryx regularly sharpen their horns on the fencing.

Ringlock fencing is suitable for containing animals in large enclosures, but not in small areas, such as capture pens.

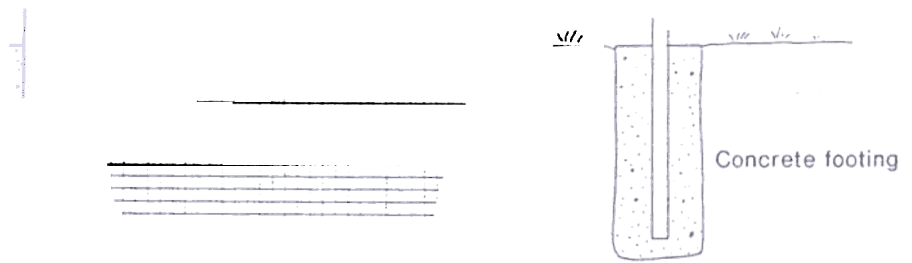
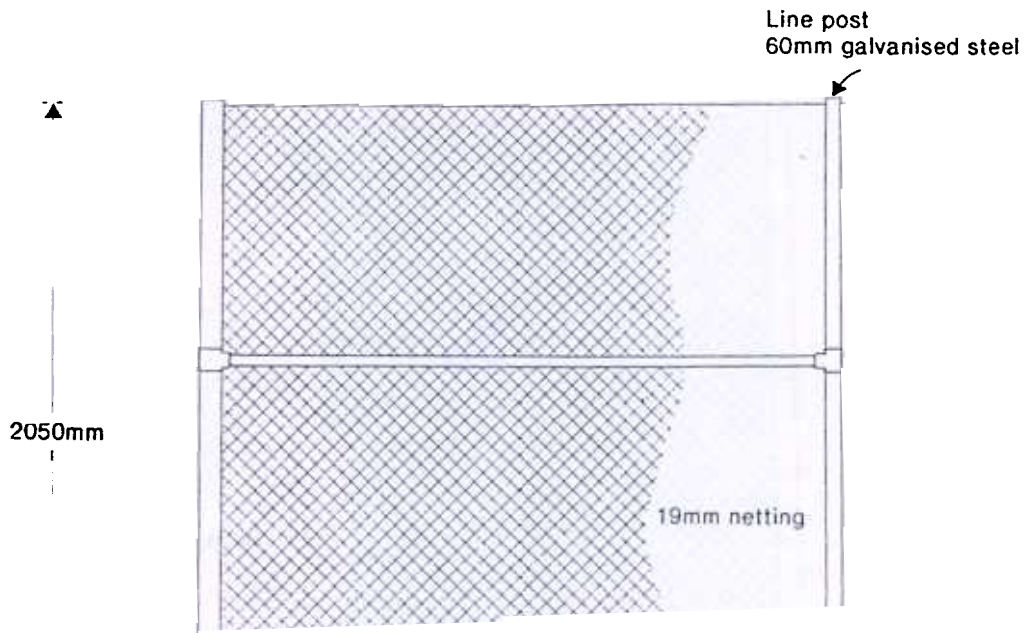
4. Capture pens, in some cases, are constructed from chainlink (mesh size 50 x 50 x 4 mm). However, this type of fencing is not suitable for ibex or gazelle (*Gazella* spp.), which may try to jump the fence and become entangled. Moreover, ibex are occasionally able to escape by making a hole with their horns. For these species it is more appropriate to use weldmesh of 3 cm².

5. Hamadryas baboons *Hamadryas papio* are enclosed within a chainlink fence 2 m high, with 12 electrified wires strung along the top, but angled towards the interior (Fig. 3). This discourages baboons from trying to scale the fence during vigorous social interactions. The external fence has been made with P.V.C. tubing, and is still in good condition after six years of use.

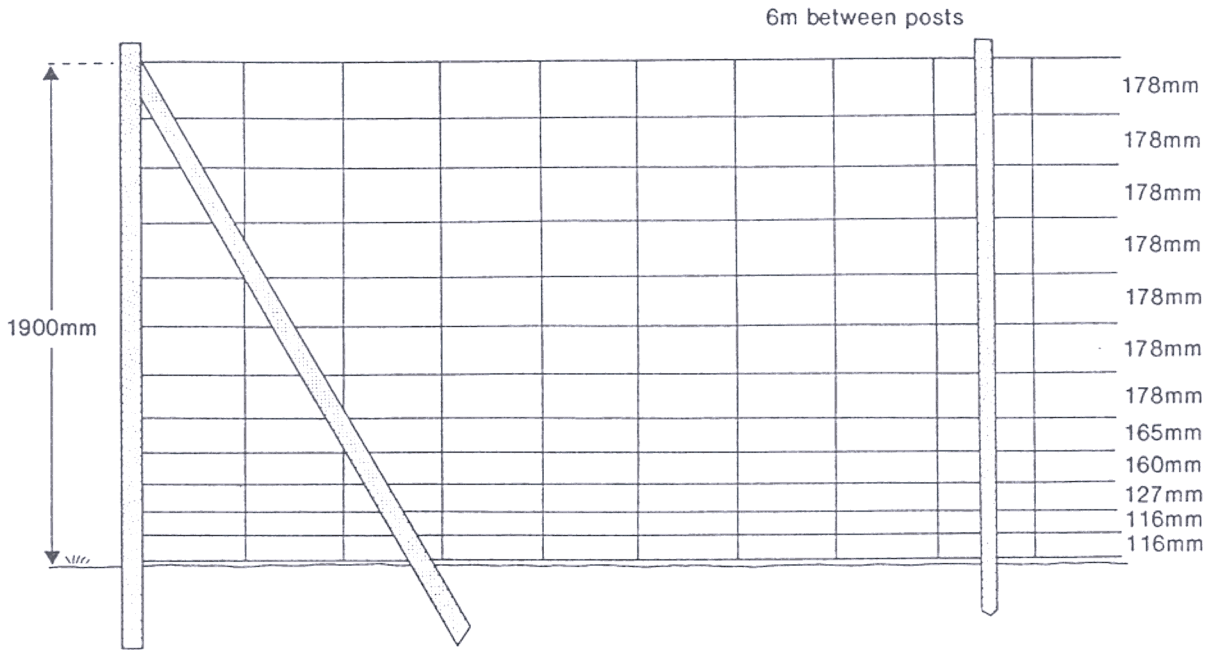
The success in enclosing baboons at the NWRC may be largely attributed to their lack of desire to escape. Experience in other countries has shown that electrified wires are often not adequate to hold some species of primates, and that a more ideal cage design would incorporate smooth walls that the animals are unable to scale.



Perimeter Fence



Baboon Enclosure



Ringlock Fence