

## A new anti-predatory behavioural strategy in stilts suggestive of adaptive evolution

Mayuri R. Wijesinghe\* and P.N. Dayawansa\*

The black-winged stilt, *Himantopus himantopus*, is a resident wader species inhabiting the marshes, mudflats, paddy fields and lagoons of Sri Lanka (Kotagama and Fernando, 1995). Observations of this species were made at the Bundala National Park in the district of Hambantota during the nesting period from May to June 1997. While stilts are known to exhibit a wide range of anti-predatory behavioural patterns (Legge, 1880; Henry, 1927; Ali, 1969), we observed a wider and more complex range of behaviour which included the broken wing distraction display.

The stilts were seen to breed in scattered groups amidst the partially inundated marshy areas of the park. Seventeen nests were observed periodically. As we approached the nesting site, the nearest incubating pair moved away from the nest and gave out loud shrill calls. The pair then started to fly around us, the intruders, while continuously vocalizing. This alerted the other individuals in nearby nests and soon a large number of stilts (18) gathered above us, all calling together and trying to mob the intruders. As the perceived threat continued, some were seen to indulge in false fights or pretended to feed with false picks (a type of behaviour reported by Legge, Henry and Ali). As we continued to approach the nests the stilts settled, some in the water, some on the bank. Some flapped their wings while remaining in one position, while others danced up and down with wings expanded, and continuing to call (the latter recorded only by Ali, 1969). The individuals gradually moved away from the nests at a slow run while still flapping their wings and calling. The birds on the bank sat on the ground and flapped their wings against the substrate mimicking a struggle. Next, they displayed the broken-wing distraction display, a behavioural pattern common among avocets, plovers and lapwings (Ali, 1969; Brooke and Birkhead, 1991) but previously not recorded in stilts. Here, one wing is stretched out as the birds tilt their bodies to one side trying to entice the intruder towards them (and away from the nest) by faking lameness or injury. All these activities were performed some distance from the nesting site and were continued for around  $\frac{3}{4}$  hr until they were successful in driving us, the intruders, away. It was clear that the behavioural patterns observed by us were more prolonged, complex, and purposeful than the behaviour observed by Ali, Henry and Legge.

---

\* Department of Zoology, University of Colombo, Colombo 7, Sri Lanka.

Why does a species exhibit such a vast complement of anti-predatory behavioural strategies? Have the stilts evolved additional strategies to protect their brood from predators? One of the primary functions of a particular behavioural pattern is its selective advantage or survival value (Davies and Krebs, 1978). Evolution is based on the existence of genetical variations which lead to different behavioural patterns and the selection of those behavioural patterns that promote the survival of the species: i.e. the individuals doing better have a greater chance of surviving and so ensuring that their genes are passed on to the next generation (Dawkins, 1995). When considering anti-predatory behaviour, the functional significance of guarding one's eggs or nestlings from predators is obvious. We suggest that the complement of anti-predatory behavioural strategies shown by the stilts have a selective advantage in an environment where the protection of eggs and nestlings is critical for the survival of the species. Indeed, observations revealed that of a total of 66 eggs only four hatched and this amounts to only 6% survival. The cause of low hatching rates was not identified, but we noted that the birds displayed all of the above mentioned behavioural strategies more forcefully when guarding the nestlings.

Harvey and Greenwood (1978) proposed that avoidance of predation has been one of the major causes of the evolution of peculiar behavioural tactics in birds. Could it be then that these behavioural strategies displayed by the stilts have developed in response to greater threats to survival? Survival today is jeopardized by the fact that man has encroached upon the natural habitats of these animals, aggravating competition for the limited resources available. Predator-prey interactions could therefore be expected to be more intense than they were several decades ago, when there was ample food and space for all to live less competitively with one another. The process of evolution continues as species are called upon to adapt to changing environments. Hence these remarkable changes in the breeding behaviour of the black-winged stilt, could at least in part, be taken as evidence of adaptive evolution.

### Literature cited

- Ali, S. and S. D. Rippley. 1969. Handbook of the Birds of India and Pakistan, Vol. 2. Bombay Natural History Society, Bombay. pp. 1-340.
- Brooke, M. and T. Birkhead. 1991. The Cambridge encyclopedia of ornithology, Cambridge University Press, Cambridge.
- Davies, N.B. and J. R. Krebs. 1978. Ecology, natural selection and social behaviour, pp. 1-18 in Krebs, J. R. and N. B. Davies. (eds.), Behavioural ecology: an evolutionary approach. Blackwell Scientific Publications, Oxford.
- Dawkins, M.S. 1995. Unravelling animal behaviour. Longman Scientific and Technical Group Ltd., U.K.
- Harvey, P. H. and P. H. Greenwood. (1978). Anti-predator defence strategies: some evolutionary problems, pp. 129-151 in: Krebs, J.R. and N.B. Davies (eds.), Behavioural ecology: an evolutionary approach. Blackwell Scientific Publications, Oxford.
- Henry, G.M. 1927 (repr. 1978). A guide to the birds of Ceylon. K.V.G. De Silva & Sons, Kandy.
- Legge, V. 1880 (repr. 1983). A history of the birds of Ceylon, vol. 4. Tisara Prakasakayo, Dehiwala, Sri Lanka. pp. 1178-1624.
- Kotagama, S. and P. Fernando. 1995. A field guide to the birds of Sri Lanka. Wildlife Heritage Trust, Colombo.