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Platform-building by male and female Ruddy Ducks

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In the Anatidae the interval between the start of nest-building and laying of the first egg is characteristically short–usually no more than 2 or 3 days (Weller, 1964). In ducks of the sub-family Anatinae, the nest is constructed entirely by the female. Males are, however, capable of performing the motor patterns appropriate to nest-building, and the behaviour is quite widespread (McKinney, 1968). McKinney considered this behaviour to be non-functional and 'vestigial', and Kear (1970) suggested that it might be triggered by the sight of a nest or of a female building.

This paper reports nest-building behaviour as relatively common in both male and female Ruddy Ducks *Oxyura jamaicensis*, 3–4 weeks preceding onset of the egg-laying season. A possible adaptive value is suggested for this unexpected behaviour which I call 'platform-building'.

The observations were made while I studied wild Ruddy Ducks in the Minnedosa pothole country and at the Delta marsh, Manitoba, Canada, during May–August 1971. I noted a total of seventy-eight separate instances of platform-building, of which sixty-eight involved females, and ten males. With one exception, these records were restricted to the period 3 May (when I first went into the field) to 4 June, with most of the records falling between 3 and 25 May. The single exception was provided by a male observed performing 'sideways' building movements on 30 June. The observations were made over all hours of the day, and there appeared to be no bias in favour of building activity in the early morning—a time when anatids generally are most active in prospecting nest-sites and building nests.

All the usual motor patterns associated with normal nest-building were performed by both males and females constructing platforms. Platforms were built over water mainly in stands of emergent dead stems of hardstem bullrush *Scirpus acutus*, though other vegetation (e.g. cattail *Typha latifolia*) was also used. Typically, platforms were more or less circular, measuring about 55 cm in diameter, and raised some 10 cm above water-level (Figure 1). A shallow bowl-like depression, formed by the bird using its beak, feet and breast, occupied the centre of the platform. In short, the platforms essentially resembled normal nests in early stages of construction. Many of the platforms were quite substantial, and capable of supporting weights of 5 kg and more. Hence, considerable effort had gone into their construction, and at least certain birds displayed a degree of tenacity in returning to them. This last statement is based on individually marked birds, of which one male and two females were observed building. One of the females was captured by a cage-trap set on a platform.

I timed platform-building bouts and the number of sideways-passing movements performed by individual birds. Female bouts averaged 6·4 min. (range 1–15 min, number of bouts, $n = 11$) with nineteen passing movements per minute, and those for males 2·0 min (1–3 min, $n = 3$) with seventeen movements per minute. Information on frequency of building bouts was harder to obtain, primarily because of the small sample of marked birds. However, platform-building featured commonly in the females' programme of activities. The general cycle was expressed as: feeding (by diving); bathing and preening; building; sleeping (loafing on platform); building; bathing and preening; feeding. The cycle's major components of feeding and sleeping alternated regularly. The bathing-preening and building phases were less regular. Nevertheless, building followed preening and preceded sleeping on nine out of sixteen separate complete cycles, and on ten out of twenty cycles it was observed to follow sleeping. On four occasions, birds were noted interrupting their sleeping bouts to build. Thus, platform-building formed a fairly regular phase in the females' cycle and the incidence of platform-building was similar to that of normal nest-building as found in incubating Ruddy Ducks (W. R. Siegfried, unpublished). Table 1 summarizes data on the amount of time birds spent on the different phases of the cycle.

Some of the platforms were found in open exposed sites and the birds did not attempt to hide themselves or their building actions. This contrasts with normal nest-building behaviour during which the female Ruddy is shy and secretive, choosing a well-

Figure 1. Platform built by Ruddy Duck *Oxyura j. jamaicensis* in *Scirpus acutus*.

Table 1. Time (in min) spent by Ruddy Ducks on bouts of sleeping, feeding, and preening and bathing

	Sleep	Feed	Preen and bathe
Females			
Average:	73	37	7
Range:	20–180	10–80	1–30
Number:	32	31	22
Males			
Average:	111	38	9
Range:	25–225	20–75	1–25
Number:	5	5	6

hidden site for the nest. Platforms were found in small 'colonies' (maximum of eight recorded in one group with an average 3-m distance between neighbouring platforms), or as isolated singletons. I doubt whether the 'colonies' were the result of social situations. A more plausible explanation would be that 'colonies' reflected a tendency by the birds to aggregate at favourable sites. Also, single birds (males as well as females) were observed building where other platforms or birds were out of sight. Individually marked birds (males as well as females) were observed to build more than one platform and also to add to the construction of platforms built by others. Some birds were observed to break off building operations at one platform, swim to another, and add to its construction. Thus, individual birds did not 'own' platforms in the same way as they would nests.

In my opinion, platform-building should not be regarded as non-functional or vestigal—at least in females it was of too general occurrence and involved too much effort and time. It is pertinent that platform-building, and loafing on platforms, was rarely observed after the end of May. During early and mid-May, Ruddy Ducks spent most of their time resting or sleeping (estimated at 65% of a normal 24-hour day); they slept on platforms, or generally tended to keep to dead emergent plant cover in which they could haul out of the water. The birds spent relatively little time in the water

itself, and then only for feeding or indulging in brief bouts of courtship. This applied especially to females; males spent relatively more time swimming around. However, both sexes rarely slept on the water. Towards the end of May the birds were often observed sleeping and resting on the water and males generally spent more time out in the open. At the beginning of June the platforms disappeared (no longer being maintained by the birds), and by the second week of June females generally became very secretive, concomitant with the onset of proper nest-construction and egg-laying. Nests were not built on the platforms.

Of all the waterfowl which breed in southern Manitoba, the Ruddy Duck is one of the last to arrive on the pothole breeding grounds; normally in the first week of May, immediately or soon after the ponds and sloughs have become free of ice. Like all other *Oxyura* spp., the Ruddy Duck is essentially warm temperate in its area of geographical distribution, and I have unpublished data (W. R. Siegfried) that lead me to believe that the species has only recently extended its breeding range beyond 50°N. I suggest that the platforms were used by the Ruddy Duck as a means of enhancing the efficiency of its thermoregulation. In short, the birds temporarily escaped the effects of cold water by hauling out and loafing on the platforms.

In possible support of this supposition, Ruddy Ducks were commonly observed rapidly to vibrate their folded wings, usually immediately following on or during the preening phase, after having hauled out on platforms. Such 'wing-shivering' was observed rarely after 1 June, and then usually on days of cold, overcast weather. Bouts of wing-shivering averaged 8 min (2–20 min, $n = 10$) in females on platforms in early May. I have described 'wing-shivering' in Ruddy ducklings which were cold, and have suggested that it might be a form of thermogenesis (Siegfried, 1973). After hauling out on platforms, adults normally rested on their bellies often lifting and holding both legs stretched and so exposing the feet to the sun; later, when sleeping, the legs were folded forwards and the feet held tucked into the flank feathers—a common resting posture of oxyurids. I suggest that while wing-shivering may be a comfort movement promoting the drying of wet feathers, it should be investigated as a possible thermoregulatory strategy.

So much for the possible function of platform-building. What of the motivation for this behaviour? I suggest that platform-building might result from a lack of co-ordination between a female's readiness to breed (in particular the nest-construction 'drive') and the availability of suitable nesting habitat. The situation in males is, however, different and the influence(s) motivating them remains obscure. Ruddy Ducks arriving in southern Manitoba are in 'good condition' and have relatively well developed gonads. Food is abundantly available, and the birds possess extensive deposits of fat. In short, females are physiologically ready to lay soon after arrival. Emergent vegetation, however, generally does not show new growth before the middle of May. At the end of May new emergent growth of hardstem bullrush and cattail, measured about 50 cm in height. Hence, females are generally denied suitable nesting habitat during the first 4 weeks or so of their stay on the breeding grounds. Weller (1959, 1964) in commenting on the Ruddy Duck's tendency to drop eggs on the ground and in the nests of other birds, says that this presumably results from variation in synchrony of nesting and laying behaviour, and that it occurs most often early in the breeding season.

If the above suggestion is correct then it explains why platform-building was observed so much more often in females than in males. Further, if the behaviour does in fact result in enhancement of the efficiency of thermoregulation, then one might expect a saving of energy to the bird. This might be relatively more important to the female, which produces larger eggs for its size than any other anatid. I have information indicating that it is advantageous for Ruddy Ducks to lay as early as possible in the season.

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Summary

Behaviour appropriate to nest-building is relatively common in both male and female Ruddy Ducks *Oxyura jamaicensis* at a time preceding by 3–4 weeks, the egg-laying season in southern Manitoba, Canada. The birds spend much time resting and sleeping on these platforms at a time

of the year when the water is still cold. It is suggested that the platforms are used as a means of enhancing the efficiency of thermoregulation.

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