

SPAWNING DATES OF THE NATTERJACK (*BUFO CALAMITA*) THROUGHOUT ITS RANGE IN BRITAIN

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With considerable help from the voluntary bodies, the Nature Conservancy Council has collated information from natterjack (*Bufo calamita*) sites on an annual basis since 1979. In the report for 1981, information on spawn dates was presented for certain sites, and it was suggested that spawning tended to occur at Merseyside and Cumbrian sites earlier in the year than at east coast and Scottish sites (Cooke, 1982).

Recently, Beebee (1985) has updated this analysis. Amongst his main conclusions were that (1) eastern populations tended to spawn later than those on the Irish Sea coast but (2) there was no significant difference between the spawn dates for the 'southern' Irish Sea colonies (Merseyside and Lancashire) and those in the 'north' (Cumbria and north Solway). It is the aim of this note to demonstrate that north Solway populations do in fact tend to spawn later than those further south.

Beebee (1985) calculated the mean first spawn date for 13 records from southern Irish Sea colonies to be 18 April (SD = 13 days); while that for 16 records from four northern colonies was 15 April (SD = 11 days). The latter group contained a colony on the north Solway, and there were evidently considerable inter-site differences within this group with natterjacks at one of the Cumbrian sites tending to spawn very early in April or even in March (Fig. 1 in Beebee (1985) and pers. comm.).

I have assembled spawning data from the two Scottish Solway colonies that have been best studied (Table 1). There was no significant difference between the mean dates for the two colonies. Combining the data, the mean first spawn date was 1 May (SE = 2 days). This was significantly later than Beebee's mean for southern Irish Sea colonies ($t_{25} = 3.2$, $P = 0.01$).

It was also later than Beebee's mean date for northern colonies ($t_{26} = 4.4$, $P = 0.001$), despite his sample containing information from one of the north Solway populations represented in Table 1. There was, however, no significant difference between this mean for the north Solway and Beebee's mean for eastern England.

Data from other sites on the Scottish Solway are fragmentary, but these two sites are believed to be typical as regards first spawn date (G. Fry, pers. comm.; M. Wright, pers. comm.; Cooke, Banks and Langton, 1984). Thus, in its strongholds on the coasts of Merseyside and southern and central Cumbria, the natterjack toad tends to begin spawning in mid April, but there is considerable and often consistent inter-site variability. At the edges of the species' known range on the north Solway coast and in eastern England, the natterjack tends to spawn later, at the end of April or in early May. The Cumbrian colonies on the south Solway tend not to have been so well monitored, and it is not possible to be precise about when natterjacks start to spawn in that area. Suffice to state that although spawn has been recorded in two sites as early as the second week of April, spawn strings have only rarely been recorded before the beginning of May (Cooke, 1981; Cooke and Banks, 1983). Within an area, the interval between the onset of the spawning season of the frog (*Rana temporaria*) and that of the natterjack is roughly 5-6 weeks (Table 2).

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TABLE 1. First spawn dates for two natterjack colonies on the north Solway coast, 1977-1984. Information provided by R. Bridson, G. Fry, M. Wright and the Scottish Wildlife Trust.

	Site 1	Site 2
1977	30 April	—
1978	5 May	20 April
1979	—	29 April
1980	1 May	26 April
1981	7 May	3 May
1982	8 May	20 April
1983	10 May	12 May
1984	24 April	25 April
Mean \pm SE)	4 May (\pm 2 days)	29 April (\pm 3 days)

TABLE 2. Approximate first spawn dates by area for the frog (Savage, 1961; Cooke, 1976) and the natterjack (Beebee, 1985 and this paper).

Area	Frog	Natterjack
Merseyside	Late February/early March	Mid April
South and central Cumbrian coast	Early March	Mid April
South Solway	Early March	Mid April — early May?
North Solway	Late March	Late April/early May
Eastern England	Late March	Late April/early May

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