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**CLOACAL SCRATCHING AS POST
SEXUAL DISPLAY IN THE
PALMATE NEWT
(*TRITURUS HELVETICUS*)**

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The courtship behaviour of European newts (*Triturus*) has been the subject of a wide literature. Following the first classification of sexual display events by Salthe (1967; see also Joly & Delsol, 1977), the elementary acts of the sequence of sexual behaviour of the smooth newt, *Triturus vulgaris*, have been precisely established by Halliday (1974, 1975). Halliday's nomenclature has provided the basis for the description of sexual behaviour in other species, these studies including the description of new acts (Halliday, 1977; Rafinski & Czaja, 1984; Pecio & Rafinski, 1985; Giacomini & Sparreboom, 1986; Faria, 1993). The courtship of *Triturus helveticus* has been described in this way by Halliday (1977) and then more precisely by Wambreuse & Bels (1984). According to these authors, the sexual sequence may end in the same way as in *T. vulgaris*. The last spermatophore transfer may be followed either by surface breathing by one or the two sexes (Halliday & Sweatman, 1976), or the male may move away from the female after performing residual ineffective acts (Halliday, 1976). The aim of the present note is to describe in *T. helveticus* a new sequence of male behaviour, which may follow spermatophore transfer, and consists of female cloacal scratching.

Newts were collected during February in the Dombes region (North-East from Lyon, South-Eastern France). Males and females were kept separately in 40 x 40 x 10 cm tanks, the bottom of which was covered with sand. Aquatic plants provided shelter. The newts were fed with *Chironomus* larvae. Observations were conducted during teaching courses in March and April, in circular 60 cm diameter dishes, the bottoms of which were covered with a fine layer of sand. Sequences were monitored according to Halliday (1975). Approximately thirty experiments involved single pairs and twenty experiments involved assemblages of two males and one female. Several sequences were monitored by a videotape recorder for a more precise description.

In about half of the successful encounters (45%), the end of the courtship was followed by a sequence of scratching of the female cloacal region by the male. This behaviour always consisted of a continuous sniffing of the female's cloaca, associated with scratching-like movements by one or both forelegs (Fig. 1). This scratching was oriented towards the anterior and pos-

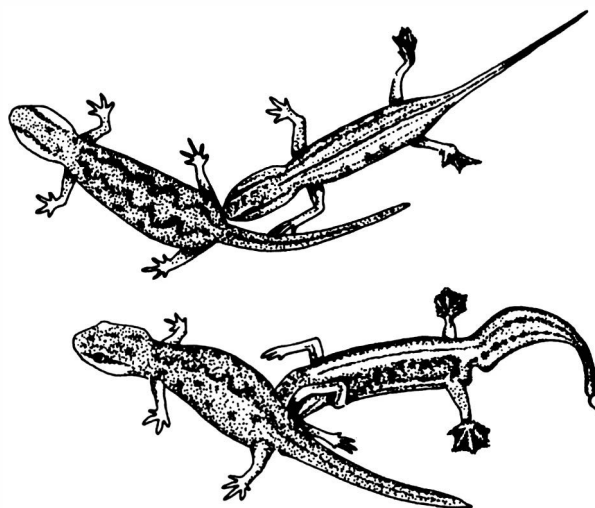


FIG. 1. Cloacal scratching behaviour in *Triturus helveticus*. Top: the male (on the right) sniffs the cloaca of the female and scratches the lower part of her tail with his left forelimb. Bottom: scratching of the female's cloacal region with the two forelimbs of the male lifted over its head.

terior parts of the cloacal region. The frequency of scratching movements was between two and three movements per second. A scratching sequence was composed of 7 to 10 bouts and each of them consisted of 4 to 11 scratching movements (mean duration of a bout: 3.43 ± 0.59 s, $n = 16$; shortest duration: 0.58 s; longest duration: 9.33 s).

In all cases, this behaviour did not incite the female to move away. But neither did the females always remain motionless. When a female moved while the male performed scratching, the male persistently followed the female, trying to keep close contact between his snout and her cloaca. The duration of an entire sequence was very variable, from 30 s to several minutes. Scratching ended when the male finally moved away from the female.

In most cases, scratching followed male and female post-mating breathing. It has been observed exclusively with females which had successfully taken at least one spermatophore. In the two-male experiments, the sniffing of the cloaca of a postmating female only elicited the scratching behaviour in the male from which the spermatophore(s) originated. Cloacal sniffing by the other male was always followed by his turning away. The behaviour of the scratching male may be assumed to be caused by the recognition of his own odour from the spermatophore. But it is also possible that such a behaviour can only be performed after the male displayed a complete sexual sequence including at least one spermatophore deposition. The function of such a behaviour may be to stimulate sperm transfer from the spermatophore to the female spermatheca.

Post-copulatory display has been described in *Taricha granulosa* by Propper (1991). In this species, it consists of an amplexus which may last from 4 h to 4

days. Such a post-copulatory amplexus is assumed to prevent insemination by another male in inducing inhibition of female sexual receptivity. In *Triturus helveticus*, cloacal scratching may be supposed to play the same role.

The fact that this behaviour has not been described previously might suggest a local specificity of the South-eastern French populations. The goal of this paper also is to promote new observations in other populations, and also in the closely related species *T. vulgaris*, *T. boscai*, *T. italicus* and *T. montandoni*.

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