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A linyphiid spider biting workers on a Sewage-treatment plant

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Native British spiders have seldom been held responsible for bites on people although it is known that a large species such as *Araneus diadematus* Clerck can pierce the soft skin of a man's arm and it is recorded that a *Dysdera* sp. caused a painful bite to the ankle of a building worker on one occasion. *Herpyllus blackwalli* (Thorell) has also been suspected of causing a bite on a woman's face which eventually left a small permanent scar. However no-one has ever suggested that the smaller species of Linyphiidae were capable of causing the slightest annoyance to man.

In July 1974 reports were received that workmen engaged on maintenance work at the Minworth Sewage Treatment Plant, Birmingham, were being bitten by small spiders emerging from the filter-beds which dropped down their necks or crawled up their sleeves. The bites caused irritation and swelling and in

several cases men left their work to receive first-aid treatment. It was found that the ointment "Iglodine" alleviated the symptoms. On 7 August one of the painters working on a filter-bed temporarily taken out of use, demonstrated the offending spider and its bite to the Safety Officer and Senior Biologist of the Upper Tame Water Reclamation Division. He placed the spider on his forearm and by gently pushing it with a finger caused it to bite, producing marked inflammation and swelling. The spider was later identified as a male *Leptorhoptrum robustum* (Westring). This species, which is widespread in Britain in marshy areas, occurs in very large numbers amongst the stones of sewage filter-beds and in the Birmingham area is the most common spider in this habitat. A total of 120 spiders were collected from amongst the webs on the surface of two of the filter beds on 7 and 28 August 1974 at Minworth, and included the following:

<i>Leptorhoptrum robustum</i> (Westr.)	14♂ 5♀
<i>Erigone longipalpis</i> (Sund.)	5♂
<i>Diplocephalus cristatus</i> (Bl.)	1♂
Immature indet. Linyphiids	95 (mostly more than half-grown)

The particular circumstances of this occurrence are worth noting. The population of *L. robustum* in a normally working filter bed may be very high. In a

study of the fauna of the Minworth filter beds covering the period February 1966 to May 1968, M. B. G. recorded a mean number of *L. robustum* of 29,000/m³ (including a large proportion of immatures assumed to be this species). This figure is based on a total of 576 samples taken during the period studied when monthly collections were made at 12 successive depths (to about 3 m) at different sites on two separate blocks of filter-beds. This work was continued in 1969 when a mean density of 1,500/m³ was recorded for adult *L. robustum* alone. In that year the highest monthly totals occurred in August and October as follows:

shaft number	date	mean number of <i>L. robustum</i> adults per m ³
D9	18.8.1969	11,200
D16	20.8.1969	3,600
D6	10.10.1969	5,200

In one sample, a cylinder 15.25 cm deep and the same diameter (volume 2765.8 cm³), in shaft D9, at a depth of about 1.5 m, there were 62 adult *L. robustum* (22,400/m³). When repair work and maintenance is required the flow of sewage is shut off and the bed begins to dry out. Within a day or two of cessation of normal working the surface of the bed becomes covered with silk strands suggesting that the immediate response to the change in environmental conditions is a massive dispersal movement. The changes which trigger this dispersal also bring about a massive mortality of the potential prey of the spiders, notably enchytraeid worms and dipteran larvae. It is while this is taking place that workmen are engaged in maintenance on the filter beds and come in contact with the emigrating spiders.

The spider fauna of sewage filter-beds is now fairly well known (mainly from collections made in the Birmingham area) and in addition to well known aeronauts includes much more local species such as *Milleriana inerrans* (O. P.-C.), *Troxochrus scabriculus* (Westr.), *Porrhomma convexum* (Westr.), *Oedotheorax*

apicatus (Bl.), *Ostearius melanopygius* (O. P.-C.), *Erigone arctica* (White), *Lessertia denticelis* (Simon). All these show an ability to exploit temporary or man-made situations and in order to survive must be able to disperse rapidly to new areas once their chosen habitat becomes unfavourable. It seems clear that *Leptorhoptrum robustum* is also able to behave in this way although it is not normally associated with pioneer situations in nature. Nevertheless, records (held by ED) of the types of habitats in which it is found in Britain suggest that it must be a very adaptable species. In East Anglia, for which there are numerous records, it is clearly a spider of fens and marshes occurring particularly in the litter layer of thick herbaceous vegetation, wet meadows and fen woodland. This also seems to be its habitat in the south of England (P. Merrett pers. com.). In the north it occurs widely on mountains, moorlands, and in upland valleys, usually under stones, but it has also been taken in pine forests with heather. It is recorded from saltmarshes on Anglesey, dune slacks at Tentsmuir Point, Fife and has also been found in the Shetlands and in the Orkneys in grassland areas.

Although a widespread species the numbers of *L. robustum* recorded in natural habitats are never, even remotely, near those shown to occur in the extremely artificial environment of a sewage filter-bed. The deep clinker of the filter-bed, in normal use, has numerous small air spaces in which light, temperature and humidity regimes probably fluctuate very little. In addition there is a fairly even distribution of abundant prey animals. This would constitute a very favourable environment for many species of spiders but, nevertheless, those able to exploit it must also be able to survive periodic environmental changes (during maintenance work) when the greater part of the system is rapidly destroyed within a day or two. Rapid emigration to alternative habitats, the ability to recolonise quickly when the former favourable conditions are restored and the capability to increase in numbers, before competitors do so, seem to be important features in the biology of these species.