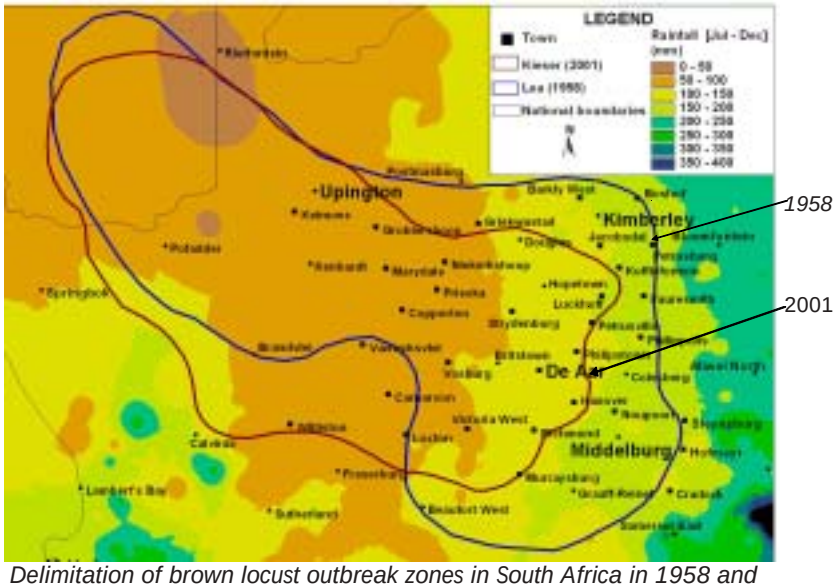
Locusts on the Move

The brown locust is endemic to the semi-arid regions of South Africa and southern Namibia, posing a threat to food security as far north as Zambia. Outbreaks occur – over roughly 24 million hectares of the Karoo – when good breeding conditions result in a dramatic increase in the density of scattered, solitary adult locusts. Previous studies have shown that there is a strong correlation between the scale and extent of outbreaks and early summer rainfall. A CPP project is helping to develop a brown locust early warning system (BLEWS). The distribution of outbreaks has been examined, using historical records of brown locust occurrence collected since the start of the twentieth century together with environmental data for the same period.

In the first systematic attempt at delimiting the brown locust outbreak area in South Africa, in 1937, the high outbreak frequency zones broadly coincided with the outbreak area subsequently defined by Lea in 1958 (see map). Comparison with the most recent delimitation of the outbreak area in 2001, however, reveals a significant westward shift in the eastern boundary since the late 1930s and 1950s, which has led to the closure of the Middleburg locust control depot and its relocation to Upington – and the south-western limits of the outbreak region have also expanded.

During the last century, there was a general increase in annual rainfall across the Karoo. There was also a westward shift in the early summer 150 mm isohyet (line on map connecting places with same rainfall in a given period) that corresponded almost exactly with the shift in the eastern boundary of the locust outbreak area between 1958 and 2001. This suggests that early summer rainfall above 150 mm is unsuitable for breeding, possibly because increased vegetation cover reduces the availability of suitable oviposition sites. In contrast, the expansion of the brown locust outbreak area in the drier southwest, may reflect enhanced breeding success due to improved soil moisture conditions for egg hatching and better vegetation cover for hopper and adult development. Over the same period, fluctuations in the grass cover of the Karoo have occurred in response to seasonal changes in rainfall and these may have influenced brown locust breeding success. Increased summer rainfall in the wetter eastern parts of the Karoo tends to result in increased grass cover and taller grasses, which are unsuitable as brown locust oviposition habitats. Furthermore, seasonal changes in vegetation cover have been enhanced by the impact of grazing management. Census data from the 1880s show a reduction in stocking rates in the Karoo, probably resulting in increased grass cover.

These changes in outbreak frequency and distribution have livelihood implications for Karoo farmers in terms of competition for pasture between grazing stock and locusts and competition for the resources needed for on-farm locust control. The improved knowledge and methodologies resulting from this research will directly enhance the operational efficiency of BLEWS to support South Africa's Disaster Management Programme. The research objective will contribute towards maximising South Africa's ability to provide timely and reliable forecasts of brown locust outbreaks both for its own food security needs and those of neighbouring countries in the brown locust invasion area.



Delimitation of brown locust outbreak zones in South Africa in 1958 and 2001

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