

# The ecological importance of brown locust outbreaks

BROWN LOCUST OUTBREAKS OFTEN FOLLOW GOOD RAINFALL CONDITIONS IN ARID AREAS. NOT ALWAYS GOOD NEWS FOR PEOPLE BUT LOCUSTS ARE A FOOD SOURCE TO VARIOUS ANIMALS AND ITS FRASS CONTAIN NUTRIENTS THAT ARE RECYCLED INTO THE SOIL.

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Locusts are one of the most notorious insects known to mankind, even mentioned in the Bible as one of the ten plagues. They are destructive crop pests and the recent 2019-2021 outbreak across regions of East Africa, the Arabian Peninsula and the Indian subcontinent resulted in about 20 million people faced with food insecurity.

Four endemic species occur in southern Africa, red locust (*Nomadacris septemfasciata*), brown locust (*Locustana pardalina*), desert locust (*Schistocerca gregaria flaviventris*) and African migratory locust (*Locusta migratoria migratorioides*). These species can undergo gregarization whereby solitary locusts seek out other locusts in large groups, breed profusely, and result in rapid exponential population growth. In southern Africa, gregarization is driven by rainfall which is influenced by oceanic and atmospheric phenomena, which give rise to good rains. For instance, the massive outbreak in North Africa was caused by two cyclones, a few months apart, which resulted in extended wet conditions over the southern Arabian Peninsula.

Economically the brown locust is the most detrimental locust in South Africa and has resulted in millions of

Rands in damages and spending on control measures. Brown locust outbreaks occur approximately every seven to eleven years and have attained plague status five times between 1985 and 2011. The recent outbreak is the first major one since 2011. It was first reported in September 2020, from the eastern and south-eastern areas of the Karoo (Fig. 1), and thereafter, it spread widely within the country and towards Lesotho. The outbreak has also been reported in other countries in the region, including Namibia and Botswana. South African authorities have already spent more than R80 million on insecticides to control the outbreak. As the outbreak is ongoing, the actual costs of damage will only be clear later. There have been some fears that the extended outbreak can cause a humanitarian crisis in the southern African sub-region as damages to crops and grazing fields increase.

Within national parks, the current outbreak is the second major one since 2006. The parks with the largest outbreaks are Mountain Zebra, Karoo, Camdeboo, Addo Elephant (Darlington section) national parks, with smaller outbreaks in Meerkat, Richtersveld, Augrabies Falls and Namaqua National Parks. In April 2021, the swarm was so intense that



A swarm of adult brown locusts cling to a twig in Addo Elephant National Park. Locusts, usually solitary, can undergo gregarization: this is the process where solitary locusts start to seek out other locusts in large groups and then breed profusely, allowing rapid exponential population growth.

a picnic spot in Karoo National Park was closed for four days. The same weekend, a wedding event in a nearby private bush camp was disrupted. Locust outbreaks have been around since long before humans and are endemic events in the drier regions of southern Africa where outbreaks are an important ecosystem driver. Therefore, similar to droughts, which are important for ecosystem function, locust outbreaks are not controlled within parks.

### Loving locusts

Many animals, including rock monitors use locusts as a food source. This is not the only advantage of locust outbreaks, they also recycle huge amounts of nutrients.



STAKEHOLDERS AROUND NATIONAL PARKS ARE STARTING TO EMBRACE BROWN LOCUST OUTBREAKS AS A NATURAL PHENOMENON AND ARE ADOPTING CONTROL MEASURES THAT ARE LESS HARMFUL TO THE ENVIRONMENT.

The current outbreak is being observed and studied to better understand the role of locusts in arid parks. Preliminary results indicate that a variety of animals utilise locusts at all stages of their life cycle. Locusts are eaten by red wing starlings, rock monitors, blue cranes, black headed heron, helmeted guinea fowl, cape crow, black backed jackal, monkeys and brown hyena. Locusts also have other roles, including the enrichment of soils through dung called frass. The frass collected from Karoo, Camdeboo and Augrabies Falls national parks contained 1.5 g phosphorus, 6.2 g potassium, 400 g carbon and 25 g nitrogen, in each 1 kg. Imagine the amount of nutrients recycled into the soil during an outbreak spanning 250 000 km<sup>2</sup>!

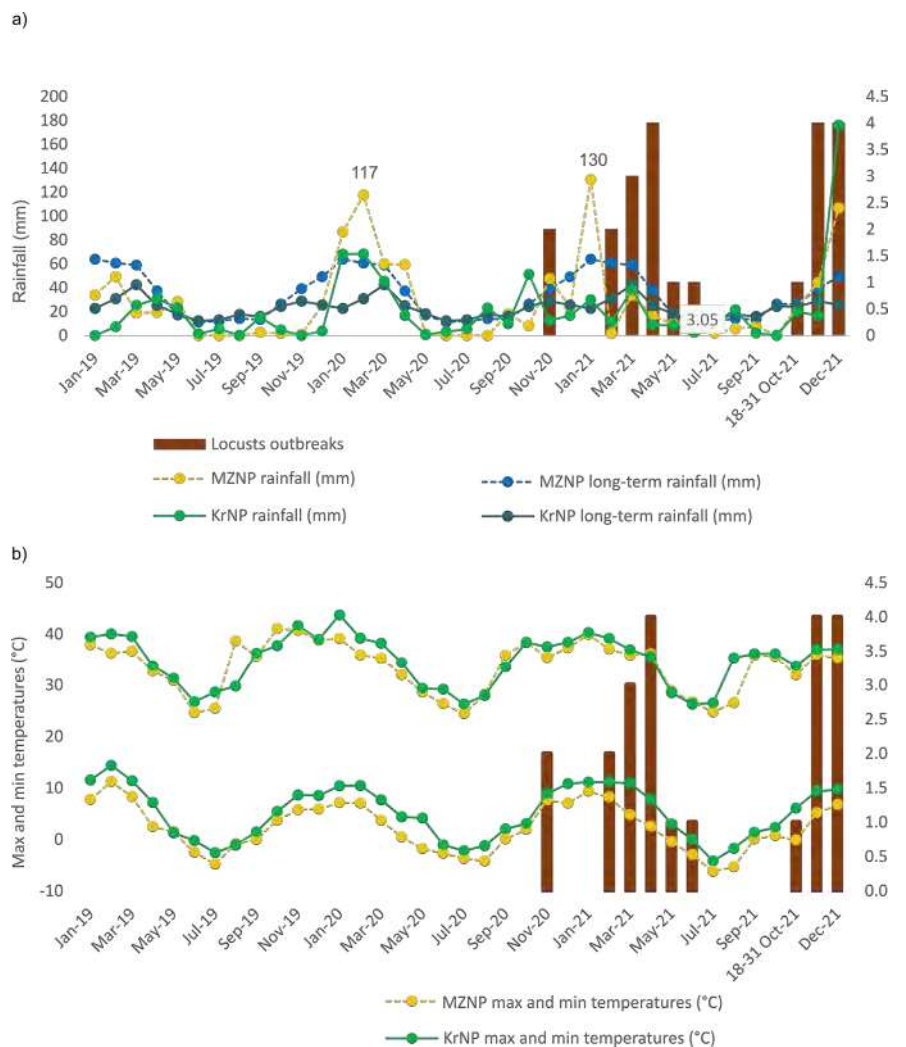


Figure 1. Hoppers and adults were first seen in November 2020 in Camdeboo National Park. Six months later, above-average rainfall in Mountain Zebra and Karoo National Parks seemed to result in new outbreaks. The numbers were suppressed when the minimum temperature falls below zero to reappear again when the temperatures climb. Long-term rainfall (mm) in the graphs is the long-term average rainfall for the site.