RUN, RABBIT

By Tony Start and Sandra Gilfillan

When we introduced rabbits into Australia, we didn't realise what a plague they would become. What have they done to our land, and what have we done about them? It's time for a closer look at this pest.

There was not much room on the little sailing ships of the first fleet for frivolous cargoes. Everything that settlers would need in a new colony had to be squeezed on board. Nevertheless, five rabbits survived the journey—and the new Governor owned three of them!

No wonder he found room for rabbits. They were easy to keep, they required little space and their fecundity ensured they would quickly provision his new larder. We don't know what happened to the Governor's rabbits, but many more were imported in the years that followed. They did well on Tasmania and many of the islands in Bass Strait, where they were marooned by philanthropists to provide food for sailors and anyone lucky enough to survive being shipwrecked. By 1844, it was reported that rabbits abounded on Rabbit Island, off Wilson's Promontory, providing 'good sport and fresh meat to the whalers'.

Things took a little longer on the mainland. Escaped rabbits survived around most of the early settlements but, being descended from domesticated breeds, they failed to colonise the bush. And so in 1846, the *Port Phillip Patriot* reported that:

> 'numerous rabbits which have from time immemorial escaped from the hutches and clutches of the vendors in the market place, have taken refuge under the police office!'

That all changed on Christmas Day in 1859. The clipper *Lightning* arrived with 24 wild rabbits consigned to Thomas Austin of Barwon Park, near Geelong. Biologist David Stead, writing in 1935, tells the story thus:

> 'Mr. Austin looked after the consignment most tenderly, and they prospered in a way that shortly amazed—and then worried—him. Within a space of six years only, he killed off his estate no less than 20 000, and estimated that his remaining stock was about 10 000! And now "the fat was in the fire".'

In Europe, where rabbits are indigenous members of wildlife communities (although they were introduced to the British Isles about 800 years ago), they have coevolved with competitors, predators, parasites and diseases, which interact in complex ways to regulate populations. In Australia, most of these checks and balances were absent and rabbit numbers kept growing. Heat proved no problem because rabbits could live under the ground. Lack of water was easily overcome; rabbits do not need to drink if they can eat succulent food.

The vast, waterless expanse of the Nullarbor Plain prevents many animals and plants moving between south-western and south-eastern Australia. However, it was no barrier to rabbits.

Previous page
Main: It seems so improbable that this fragile European mammal could wreak havok in arid Australia.
Photo – Bill Bachman
Background inset and left: A remarkable and rare succulent, this undescribed samphire has probably survived because its sap is too salty for rabbits.
Photos – Tony Start

Above far left: A mulga-bench in a secluded hollow; a glimpse of life as it was in a rabbit shooter's camp on the Nullarbor.
Photo – Tony Start

Above left: Desperate farmers fumigate rabbits in their warrens.
Photo – VB-CRC

Left: Old photographs remind us of rabbit plagues before myxomatosis brought some control.

Inset: Cover of *TIME* magazine issue featuring a VB-CRC Research Project article. The rabbit is a problem for all Australians.

Right: Rabbits thrive in the harsh, tree-less expanse of the Nullarbor Plain.

Below right: Rabbits have occupied boodie warrens and ward's weed has replaced the native chenopods and shrubs eaten out by the rabbits.
Photos – Tony Start

There may be no trees in its most desolate centre, but the Nullarbor supports an amazing community of plants that belong to the family *Chenopodiaceae* (samphires, salt bushes, blue bushes, etc.) and many of them have succulent leaves. Rabbits even devour the species that protect themselves with spines. Thus rabbits thrive where rain is scarce and surface water is almost always wanting.

The Nullarbor even provided shelter. Before the rabbits arrived, boodies (burrowing bettongs) abounded. They lived in huge warrens, and presumably fed off the life-giving chenopods. Nowadays, the boodies are gone, but all their warrens are occupied—by rabbits. (Or were, until rabbit calicivirus arrived.)

WERE RABBIT-PROOF FENCES RABBIT-PROOF?

By 1895, rabbits had been spotted near the Western Australian border. Three years later, they were at Esperance, a coastal town 700 kilometres farther west. Alarmed, the State Government decided to build a fence from Starvation Boat Harbour, 120 kilometres west of Esperance, to the Eighty Mile Beach, where the Great Sandy Desert meets the Indian Ocean. The fence was 1833 kilometres long and traversed heathlands, woodlands and spinifex deserts in areas that Europeans had hardly explored. As a surveying feat it ranks alongside Canning's stock route, and, like the stock route, wells along its length are still landmarks on modern maps. However, as an engineering feat, it was in a league of its own. No other venture of that era required so much wire mesh, let alone other materials, to be transported and erected across trackless land to form a barrier that rabbits could not get over—or under.

Alas, work on the fence began in 1901, too late to stop the rabbits. So two more fences were built. The No. 2 Fence started 120 kilometres farther west and ran northward for 1160 kilometres to join the first one near Yalgoo. The No. 3 Fence stretched 258 kilometres westward from the original fence to the coast near Kalbarri. Despite the huge expense, they failed to stop rabbits, which soon colonised all the habitat that would support them.

RABBIT DAMAGE

Every cloud has its silver lining. Rabbits provided meat for the pots of many a prospector and settler. The huge numbers of rabbits on the Nullarbor supported professional rabbit shooters; rabbit fur has been used to make all sorts things from furry toy koalas sold in souvenir shops to felt for the famous Australian Akubra hats. Even in nature, some predators have adapted to a diet of rabbit. The large birds of prey, such as wedge-tailed eagles, are examples.

Nevertheless, the list of benefits is short when compared to the litany of damage that rabbits have composed. Offsetting the economic products, seven rabbits eat about the same amount as one sheep, so they seriously reduce agricultural production by directly competing with stock. Moreover, unlike stock, they can't be moved from paddock to paddock to rest the pasture. Consequently, their uncontrollable grazing causes serious land degradation and soil erosion.

Their impact on nature conservation has been incalculable. Their activities

are listed in the Commonwealth's Endangered Species Protection Act as a Key Threatening Process in the Australian environment. In WA, they devour huge amounts of vegetation, and their diet includes many threatened species. In a nature reserve near Perth, we found that every flower spike in a population of threatened glossy-leafed hammer orchids (*Drakaea elastica*) had been nipped off by rabbits and many had been dug up.

At Cooma Well, which provided water for the men who constructed the rabbit-proof fence across the Little Sandy Desert, a few old *Acacia oswaldii* trees grow on a flat. In contrast to the spinifex round about, the flat is clothed in tussock grasses and herbs. In that part of the world, *Acacia oswaldii* grows only on flats like this one. It is unfortunate, then,

that some of the trees at Cooma Well are dead and all the rest are senescent. Although the live ones still set seed, there are no seedlings, because rabbits devour them. We will never know whether smaller plants, particularly herbs, have been lost, eaten out by rabbits. However, it is likely that *A. oswaldii* will die out there unless rabbits go first.

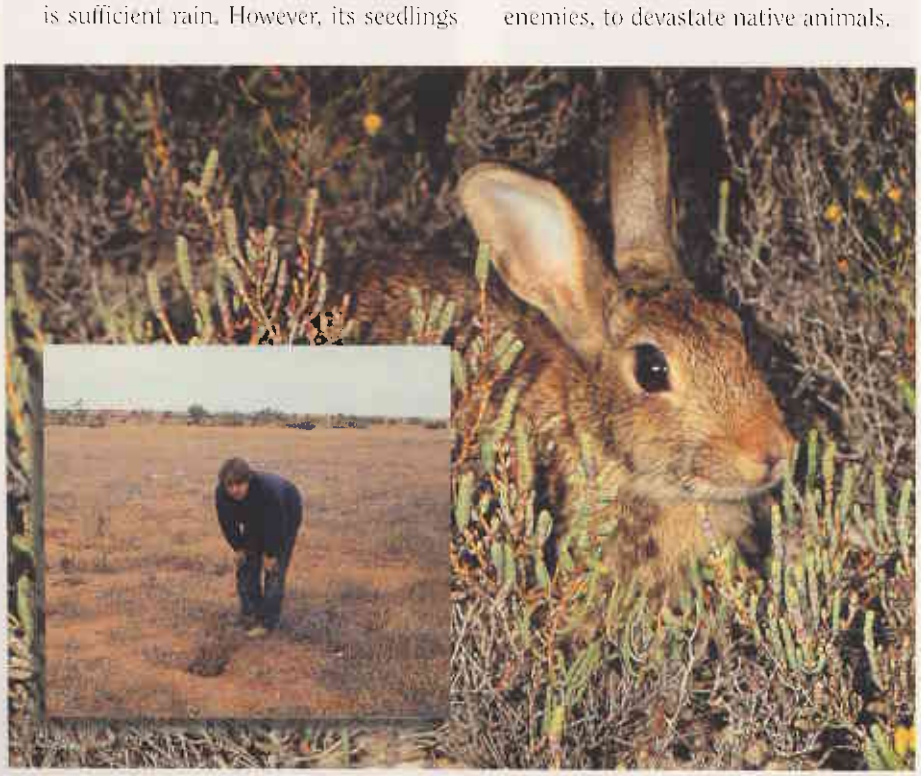
These are just two examples, among thousands, of localised damage. The Nullarbor provides an example at a larger scale. Western myall (*Acacia papyrocarpa*) is a beautiful and long-lived tree that forms open woodlands around the treeless plain. It flowers and drops seed, which germinate when there is sufficient rain. However, its seedlings are to rabbits and sheep as ice-cream is to children. Since these animals arrived in the myall woodlands, almost no seedlings have become young trees. Admittedly, sheep are as much to blame in the areas used for pasture; but on the northern side of the plain there are no sheep, and no young myall.

As rabbits colonised Western Australia, one of their European predators followed. The fox thrives on rabbits as it eats native Australian mammals to extinction. Even feral cats have flourished where rabbits abound. And so the rabbit wreaks havoc as a herbivore and, ironically, helps the same feral predators, which are its own enemies, to devastate native animals.

CAN WE CONTROL RABBITS?

For a hundred years, humans have tried to suppress the diminutive rabbit. We have shot them, poisoned them and trapped them. We have sent ferrets down their burrows, fumigated, dug up and ripped the warrens apart with bulldozers. We have even blown them up, and still the rabbits flourish.

Myxomatosis has provided some control since the 1950s. Its effect was extended by importing new vectors, like Spanish fleas, that could live in more arid places. However, the myxoma virus is one that can evolve rapidly, and there are now several less virulent strains living in wild rabbit populations. They do not necessarily kill their hosts, but they



Above left: Western myall and pearly bluebush provide picturesque landscapes and important habitat over vast tracts of remote Western Australia, but for 100 years or so sheep and rabbits have eaten almost every myall seedling.

Above: CALM scientists are monitoring the benefits of RCV. Although this young myall is protected by mesh, exposed neighbours are just as healthy because RCV has killed most of the rabbits.
Photos – Tony Start

Left: Above ground, rabbits are vulnerable and constantly alert.
Photo – Jiri Lochman

Left inset: CALM scientist, Sandra Gilfillan, looks for signs of life on a boodie-turned-rabbit warren. Many warrens are collapsing since RCV killed most of the rabbits.
Photo – Tony Start

induce an immune response that protects the rabbit from more virulent strains. Despite this, myxomatosis still provides a useful check on rabbit numbers.

Two emerging factors may help to control rabbits. One is the possibility of developing an immune response to proteins that are involved in the rabbit's reproductive process. This would make them sterile. Ideally, the protein would be produced by an organism such as a benign virus (perhaps even one of the non-virulent strains of myxoma virus). To make the virus produce the right protein, scientists would have to transplant the appropriate gene into it. This system would be humane and economical because the rabbits would become sterile without any side-effects or discomfort, and the sterilising agent would be transmitted through rabbit populations naturally. CALM scientists are working on the system with colleagues in the Vertebrate Biocontrol Cooperative Research Centre (see 'Outfoxing the Fox', *LANDSCOPE*, Summer 1988–89).

The other factor is rabbit calicivirus (RCV). This virus has received much attention in the media, and not all of the reports have been accurate. Although its introduction to wild rabbits in Australia was precipitated by its escape from field trials on Wardang Island, off the South Australian coast, exhaustive trials in quarantine-secure laboratories in Australia and overseas had shown that RCV could not infect any other species. Indeed, there are several species of rabbit and hare in Europe and north America and none of them, except the European rabbit, can carry the disease.

RCV spread naturally to Western Australia, where it caused huge mortality among rabbits on the Nullarbor Plain. An intensive monitoring program by CALM scientists, at sites in nature reserves on the northern edge of the Nullarbor, has found that many of the warrens are completely deserted and the burrows are collapsing. On most others, where there may have been thirty or forty burrows, no more than one or two are still in use. Excitingly, western myall seedlings are now growing up, and most of them are untouched by rabbits. In arid areas, growth is driven by rain, so we will have to wait until there has been good rainfall before we can expect to see dramatic responses in other organisms.

At South Stirling, however, CALM scientists are working with colleagues from Agriculture WA to monitor the effect of the disease on rabbits, pasture production and natural vegetation. Here, the disease has spread through the rabbit populations, but they have been able to recover rapidly. Intensive monitoring is occurring at other sites around Australia, and a pattern of pronounced decline of rabbit numbers in arid areas (but less effect in higher rainfall areas) is emerging. This may be explained by the fact that rabbits less than about eight weeks old are not killed by RCV, but they acquire an immunity for life. In the higher rainfall areas, and especially where they can feed on well-fertilised pasture, there are many young rabbits in the population most of the time. Thus there is always a group of rabbits to replace the breeding stock within two or three months of an epidemic.

We are at war against rabbits and we need variety in our arsenal. Rabbit calicivirus is a weapon that may not be effective everywhere, but it is showing promise in many of our arid lands. That is good news, because those are the places where rabbits cause enormous damage and we have been unable to control them for economic and logistic reasons. If rabbit calicivirus lives up to that promise, we will at last have a weapon that works where other measures are ineffective or impractical.

Top: Boodies provided prefabricated warrens for rabbits across Australia but they, themselves, only survived on islands off the Western Australian coast.
Photo – Jiri Lochman

Above: Centuries-old boodie warrens were taken over by rabbits, but now the burrows are collapsing; RCV has killed most of the occupants.
Photo – Tony Start

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'Conserving the western ringtail possum' tells a story of rehabilitation, release and repopulation.

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'The Art of Interpretation' on page 36 discusses how interpreters use a variety of techniques to enrich our experiences.

What have rabbits done to our land and what have we done about them? Find out in 'Run, Rabbit' on page 49.

Discover the fascinating world of 'Starfish, Urchins and their Relatives' on page 10.

Learn about a study of life in the tropical mudflats of Roebuck Bay on page 16.

FEATURES

REGULARS

COVER

Computers and the Internet are putting CALM's Western Australian Herbarium within easy reach of researchers, students and wildflower enthusiasts. See 'From Here to Eternity' on page 40.

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