

Lifestyle

Exploring the invasion of plants and animals

Bookshelf

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Title: Out of Eden - An Odyssey of Ecological Invasion

Author: Alan Burdick

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Reviewed by: A W Sangster

The subtitle of this book gives a better understanding of the contents of the book as it addresses the worldwide invasion of plants and animals where they are not normally found.

Out of Eden is probably more of a provocative title to catch the reader's attention. However, the brown snake on the cover is very much a reality in the text, as a considerable amount of space is given to the invasion of the brown tree snake into the island of Guam in the Pacific.

The migration or the establishment of a particular plant or animal species in an area not normally associated with that particular plant or animal may be deliberately caused, or may have inadvertently happened.

The planting of the breadfruit associated with Captain Bligh is well known and can be regarded as a deliberate act of species establishment.

And the Giant Asian carp introduced to control aquatic weeds in the Mississippi river is another deliberate planting. However, there are many unwanted species which do their fair share of undesirable destruction and which consume significant resources for control.

The Asian long-horned beetle has led to the destruction of several city blocks of maples in Brooklyn, the South American fire ant costs Texas billions of dollars annually, the Mediterranean fruit fly more billions and the list goes on.

The city of Miami and the associated Florida environment is a prime example of the invasion of unwanted and discarded 'pets'. The local animal catcher cruises the suburbs of Miami capturing stray lions, tigers, cougars, rheas, and macaques - even once a bison on the freeway. Once a 22-foot python was captured beneath a suburban home.

Altogether, it is estimated that there are at least 5,000 introduced plant species in the US ecosystems, compared with the 17,000 known native plant species.

The huge expansion of air and sea travel is a major factor as planes, ships and travellers themselves are largely responsible for this ballooning expansion of species invasion. The invaders come in crates, in cargo containers, in the landing gear of airliners and in the ballast water that ships carry to counterbalance the weight of cargo containers.

Fish have spread with the opening of canals, plants have spread along railroads; sponges and other aquatic species have spread on the bottoms of boats.

The author is a senior editor at Discover magazine and has travelled widely and worked with veteran environmentalists in writing this excellent book.

"Out of Eden is a dazzling personal journey through this strange and shifting landscape. Alan Burdick tours the front lines of ecological invasion in Hawaii, Tasmania, Guam, San Francisco; in lush rain forests, through underground lava tubes, aboard an Alaska-bound oil tanker and inside a spacecraft assembly facility at NASA. He follows world-class scientists - invasion biologists, ecologists - and a global cast of alien species to ask: What exactly is nature? What is natural?"

Quite apart from the details given in many of the chapters; the author seeks to grapple with the overall concept of "species invasion", which some experts in biological invasion have begun to refer to fearfully as "the homogenisation of the world". As one ecologist puts it in a very perceptive way:

"As the human race spreads and its sphere of disruption widens, the natural world is winnowed only to those plants and creatures that can thrive in our wake. As nature's most pervasive invader, human civilisation has become a force of natural selection in its own right. Owing to simple disregard, many of the organisms we see - and many more that we do not - are being selected against."

The book has 24 chapters but is essentially divided into three major sections which deal with:

The brown snake in Guam, the Hawaiian experience, and Setting Sail, the marine experience. The author describes his journey in great detail and his contact with an army of biologists,

environmentalists, miscellaneous officials and people in all walks of life. It is truly a fascinating journey told with quiet authority and good humour.

The brown snake in the island of Guam is the first section, and what an exciting story this is. It occupies four chapters covered by the title: In the Serpent's Embrace. How did the snake get to the island in the first place? The most likely story is that it came coiled in the dashboard of a jeep or some other wartime salvage from a military base in the Admiralty Islands near New Guinea.

Guam had no real snakes before this invasion, and the story of that invasion represents an ecological disaster. The bird population, which had lived for centuries without predators, had become docile and was not equipped to resist the new challenge.

The bird population was largely wiped out, and in a seminal study by Julie Savidge she established the fact that the snakes were responsible. The paper, Extinction of an Island Forest Avifauna by an introduced Snake, became a classic.

In the case of Guam, the Malthusian relationship between a predator and its prey does not hold. For the bird population having been decimated, the snakes did not die out for lack of a food source. A new food source emerged for the snakes in the form of skinks, and geckos (lizards), which had previously been controlled by the birds.

The story of Guam and the snakes in the island largely turns now on understanding the behaviour of the snakes and on developing methods of control and eradication. Special electrified fences, snake traps, dogs and strict vigilance have become the strategies to control the pest.

There has been some indication of success in reducing the population but the cunning of the snakes is revealed in a series of videotapes of their nocturnal behaviour. A critical control issue is the prevention of the snakes gaining access to airplanes leaving Guam.

Which leads into the second section of the book titled Paradise in Sight. Chapters 5-14 deal with the experiences of the Hawaiian Islands. Hawaii has been described as an ecological jewel: 90 per cent of Hawaii's native species are endemic.

The islands are the most isolated major landmass on earth.

The author travels through several of the islands of the Hawaiian chain and marvels at the variety of the flora and fauna. He also delves into some of the Polynesian traditions and patterns of historical migration.

Hawaii has had its share of invasions, the yellow jacket (wasp) being a particularly virulent adversary of many local insects, thus impacting on the birds and their natural food. But on the whole the Hawaiian Islands have so far been spared major devastation. The watch-out for the Guam brown snake is a particular area of critical interest.

Part three, Setting Sail, chapters 15-24, explores a variety of marine experiences with specific references at times to San Francisco, New England and Tasmania.

The marine environment is fundamentally different from the land. Terra firma is firm. The sea is the opposite. It is medium of constant motion, its water driven horizontally, vertically and in vast basin-spanning gyres (whirlpools) by wind, sun, heat, salt and gravity.

To live on land you have to move. In the sea the movement happens for you. A huge number of studies encompass this part of the book.

One involves travel on a large tanker in the Pacific and the study of ballast water tanks. The exercise was essentially developing a method of fingerprinting the water in ballast tanks. Recent regulations require ships to exchange their ballast water in mid-ocean (and not in port). How can an inspector be sure that a ship has changed its ballast in mid-ocean?

Another was the impact of the European green crab on marine life on the east coast of America. The crab is an unusually irritable and rapacious creature. Since its arrival, the population of shore crabs has declined and the population of two native clams has plummeted. The study seeks, as in the Guam study, to specifically link the green crab to these declines.

A key question is what is the impact of an invasion. While with terrestrial systems there is greater certainty in making conclusions, as the brown snake example shows. In the marine environment, however, conclusions are far less certain.

A further consideration is the difference between the land and marine environment. While it might be difficult but not impossible to largely eliminate the brown snake from the island of Guam, the prospect of containing the green crab is even more daunting.

Another major difference between land and sea is in biological control. While biological control has been successfully tried in some countries - Australia with rabbits - biological control has not yet been attempted in a marine environment.

The book represents an excellent attempt to show how invasions of one or other species can have significant effects on existing environments.

The research which has been demonstrated and the studies that have been done represent a front-line area of biological research. Scientists in this area will find the volume both interesting and inspiring for its coverage and "A rich and panoramic view of life on our planet".