Norops grahami **System:** Terrestrial

Kingdom	Phylum	Class	Order	Family
Animalia	Chordata	Reptilia	Squamata	Polychrotidae

Common name Graham's anole (English), common lizard (English), Jamaican anole (English)

Synonym
Anolis grahami , Gray, 1845
Anolis iodurus , Gosse, 1850
Anolis punctatissimus , Hallowell, 1856
Anolis heterolepis , Hallowell, 1856

Similar species

Summary The Jamaican anole *Norops grahami* was introduced to Bermuda from Jamaica in 1905 to reduce populations of the fruit fly (*Ceratitis capitata*). In 1958 it was observed to predate heavily on beneficial insect species brought in to control introduced scale insects, subsequently resulting in the introduction of the great kiskadee (*Pitangus sulphuratus*), now a serious threat in itself. More recently *N. grahami* has been observed to predate on, and compete with juveniles of the 'Critically Endangered (CR)' Bermudian rock lizard (*Eumeces longirostris*).

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Species Description
Norops grahami has a mean snout to vent length of 68.9 mm for males (Losos, 1996).

Notes
Subspecies *Norops grahami grahami* is reported from western Jamaica and Cabarita Island off Port Maria; and *N. g. aquarum* from Portland and St. Thomas parishes, Jamaica (Reptiles Database, 2010).

N. grahami is the most widespread and common of three introduced anole lizards present on Bermuda; the others are the Barbuda Bank tree anole (see *Anolis leachii*) and the Barbados anole (*Anolis extremus*) (Wingate, 1965). The effects of these lizards, particularly *N. grahami* led to the introduction of the great kiskadee (*Pitangus sulphuratus*) as a biocontrol agent in 1957. However, this biocontrol attempt was a failure; *P. sulphuratus* has been implicated in the population declines of native insect, bird and reptile species on Bermuda (Cheesman & Clubbe, 2007; Davenport *et al.*, 2008).

Uses
Norops grahami was first introduced to Bermuda as a biocontrol agent to reduce populations of the fruit fly (*Ceratitis capitata*) in 1905 (Bennett & Hughes, 1959; Wingate, 1965).

Habitat Description
Although primarily aboreal, *Norops grahami* occupies a very wide range of habitats on Bermuda. It is observed commonly on trunks and branches of trees, on houses, stone walls, fences, piles of timber or rubble, in the taller weeds of open fields, and on open ground up to 25 feet from cover (Wingate, 1965). This species remains active all year on Bermuda although on windy overcast days it generally takes shelter near the ground in dense shrubbery, grasses, or in rubble walls. It commonly takes refuge from danger by running down into matted ground cover and crevices of walls, but will also escape upwards in larger shrubs and trees (Wingate, 1965).

Nutrition
The diet of *Norops grahami* was found to consist almost entirely of minute foliage insects (Simmonds, 1958). In order of abundance these included: Hymenoptera, especially *Brachymyrmex*, *Pheidole*, *Iridomyrmex* (Formicidae), *Aphytes* (Eulophidae) and *Chalcids* (Chalcidae). Homoptera, especially *Aphis* (Aphidae), *Pulvinaria* (Coccidae) and *Psocidae*. Diptera, various species, especially *Hippelates*. Coleoptera, various small species, especially *Ayza*, *Cybocephalus*, *Lindorus* (Coccinellidae). Lepidoptera, various species, adults and larvae (Simmonds, 1958). There was little seasonal variation in either quantity or variety of food taken, but individuals exhibited great variation in the composition of their diet; this was thought to be due to local variation in insect populations and possible habituation of some individuals to eating one particular species (Simmonds, 1958). In addition to insects, *N. grahami* has also been observed to feed on juveniles of native skinks and the eggs of native birds on Bermuda (see General Impacts).

General Impacts
Noted to feed mainly on insects,*Norops grahami* and other introduced anole lizards were observed feeding heavily on insect biological control agents that were brought in to control introduced scale insect (Simmonds, 1958); this is thought to be partly resposible for the failure of the Coccinellidid *Cryptolaemus montrouzieri* to establish itself (Bennett & Hughes, 1958).
N. grahami has also been observed to prey on juveniles of the 'Critically Endangered (CR)' Bermudian rock lizard (*Eumeces longirostris*) (Griffith & Wingate, 1994; in Bacon *et al.*, 2006) and predate on the eggs of the native, eastern blue bird (*Sialia sialis*) (Thomas, 2004; in Bacon *et al.*, 2006). Although primaily aboreal, juvenile *N. grahami* can be observed foraging on the ground in skink habitats, and therefore almost certainly competing directly at times with hatchling and juvenile *E. longirostris* (Edgar, pers. comm.; in Bacon *et al.*, 2006).

Management Info
Biological control: The great kiskadee (*Pitangus sulphuratus*) was introduced as a biocontrol agent for introduced anole lizards including the brown anole (*Norops sagrei*) in 1957. However, this biocontrol attempt was a failure, with *P. sulphuratus* playing a significant role in the population declines of native insect, bird and reptile species on Bermuda (Cheesman & Clubbe, 2007; Davenport *et al.*, 2008).

Pathway
Norops grahami was introduced to Bermuda to control populations of the fruit fly *Ceratitis capitata* in 1905 (Wingate, 1965) as they were believed to be responsible for suppressing various fruit fly populations on Jamaica (Bennett & Hughes, 1

Principal source:

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Summary: This compilation of information sources can be sorted on keywords for example: Baits & Lures, Non Target Species, Eradication, Monitoring, Risk Assessment, Weeds, Herbicides etc. This compilation is at present in Excel format, this will be web-enabled as a searchable database shortly. This version of the database has been developed by the IUCN SSC ISSG as part of an Overseas Territories Environmental Programme funded project XOT603 in partnership with the Cayman Islands Government - Department of Environment. The compilation is a work under progress, the ISSG will manage, maintain and enhance the database with current and newly published information, reports, journal articles etc.

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