

## *Norops sagrei*

**System:** Terrestrial

| Kingdom  | Phylum   | Class    | Order    | Family        |
|----------|----------|----------|----------|---------------|
| Animalia | Chordata | Reptilia | Squamata | Polychrotidae |

**Common name** Bahamian brown anole (English), Cuban brown anole (English), brown anole (English)

**Synonym** *Anolis sagrei*, (Cocteau in Duméril and Bibron, 1837)

**Similar species** *Anolis carolinensis*

**Summary** *Norops sagrei* (brown anole) can be identified by its extensible throat fan that is often coloured yellow or reddish-orange and has a white line down the centre of its back. *Norops sagrei* is a habitat generalist that prefers the open vegetation of disturbed sites. It is a ground dweller but will venture several feet up into trees and shrubs. *Norops sagrei* compete with *Anolis carolinensis* and other introduced congeners. *Norops sagrei* also prey on the hatchlings of *Anolis carolinensis*.



[view this species on IUCN Red List](#)

## Species Description

*Norops sagrei* (brown anole) is a “trunk ground ecomorph” sensu (Williams, 1983). It is described as having an extensible throat fan that can be yellow to red-orange. This species can be between 13 and 21.3cm. It also has enlarged toe pads and a short snout (Campbell, 2002). Brown anoles can erect a dorsonuchal crest when exposed to certain stimuli. The tail may have a crest-like ridge, but this is highly variable between individuals and should not be confused with the dorsonuchal crest. Also, the tail is laterally compressed. Females have a light line down the middle of their backs, but males do not. They tend to have a lighter mid-dorsal stripe that is distinct and often boldly patterned in females and often indistinct in males. Individuals change their colours and patterns throughout this range (Ann Paterson., pers. comm., 2005). Male colour is highly variable, ranging from light grey to nearly jet-black and plain coloured - to covered dorsally with irregular dark patches or chevrons and a network of light lines. Females exhibit a large range of colour, but nearly always have some type of obvious wavy dorsal pattern along the midline of their back (Enature.com Field Guide, undated).

## Notes

Tokarz *et al.* (2001) state that, “The dewlap of *N. sagrei* is a relatively large and often brightly coloured throat skin that can be extended and retracted in a variety of visual displays.” The dewlap is considered to be a sexually dimorphic trait in anoles because males in most species have a larger dewlap than females. Moreover, there is evidence that the sexes differ in at least some neural and other morphological features that are involved in display of the dewlap. The sexes also differ in the social context in which the dewlap is used. Males in agonistic interactions extend their dewlaps more frequently than females and, unlike females, also display the dewlap during courtship. It has been proposed that the display of the dewlap by males may play an important role in species recognition, female mate choice, male-male competition, and even predator deterrence (West-Eberhard, 1983).

## Uses

Wardle (2002) reports findings which show that on islands without *Norops* spp. there is a great magnitude of leaf damage to sea grape (*Coccoloba uvifera* L.) which is indicative of a lizard-induced trophic cascade.



## Habitat Description

*Norops sagrei* (brown anole) is a ground dweller but will venture up several feet into trees and shrubs and prefers drier areas. Individuals occur primarily on the trunks of trees and on the ground (Rand and Williams, 1969). Campbell (2002) reports that the brown anole is a habitat generalist that generally prefers fairly open vegetation of disturbed sites.

## Reproduction

Adult *Norops sagrei* (brown anoles) breed during the summer months (Lee *et al.* 1989; Tokarz *et al.* 1998). It is not clear when they establish territories. Although they become more conspicuous during the breeding season, there have been no empirical tests to determine their degree of territoriality during the non-breeding season. It is not clear whether they cease to defend territories at the end of the breeding season (Ann Paterson., pers. comm., 2005).

## Nutrition

Campbell (2002) states that, "Their native diet consists mainly of small arthropods, annelids, and molluscs."

## General Impacts

The successful occupation of different types of habitats by *Norops sagrei* (brown anole) is attributed partly to its use of thermo-regulatory behaviours such as basking in solar radiation to select acceptable microclimates at different latitudes and altitudes (Rogowitz, 1996). It is reported that brown anole when present, reduce the density and diversity of spiders upon which they feed (Wardle, 2002). Greene *et al.* (2002) state that, brown anole competes successfully with native green anole (see [Anolis carolinensis in IUCN Red List of Threatened Species](#)) and other introduced congeners. Campbell (2002) observes that without the brown anole, the native green anole occupies perches from ground to crown, but the presence of the brown anole causes the green anole to move higher, occupying trunks and crowns of trees. Brown anole demonstrate intra-guild predation (IGP), which is defined as killing and eating among potential competitors and have been reported to prey on the hatchlings of green anole. *N. sagrei* have also been observed consuming hatchling brown anoles, although this behaviour is not well understood and it is not known whether this behaviour is common (Nicholson *et al.* 2000).

## Management Info

Campbell (2002) observes that, no control or eradication measures have been implemented for *Norops sagrei* (brown anole), in Florida (North America) where it has established. He further adds that this species would be very difficult if not impossible to completely eradicate due to its high density, high reproductive potential, and habitat generality.

**Principal source:** [Campbell, 2002. The Brown Anole \(\*Anolis sagrei\* Dumeril and Bibron 1837\)](#)

**Compiler:** National Biological Information Infrastructure (NBII) & IUCN/SSC Invasive Species Specialist Group (ISSG)

**Review:** Ann V. Paterson, Ph.D. Nell Mondy Chair, Department of Natural Sciences, Williams Baptist College USA

**Publication date:** 2008-05-31

## ALIEN RANGE

[1] BELIZE

[1] GRENADA

[1] JAMAICA

[1] SAINT LUCIA

[5] UNITED STATES

[3] CAYMAN ISLANDS

[1] GUAM

[1] MEXICO

[1] TAIWAN

## BIBLIOGRAPHY

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### Management information

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**Summary:** Available from: <http://www.feral.org.au/wp-content/uploads/2010/03/PC12803.pdf> [Accessed August 19 2010]

[Campbell, T. 2002. The Brown Anole \(\*Anolis sagrei\* Dumeril and Bibron 1837\). The Institute for Biological Invasions: The Invader of the Month, February 2001.](#)

**Summary:** Information on description, economic importance, distribution, habitat, history, growth, and impacts and management of species.

Available from: <http://invasions.bio.utk.edu/invaders/sagrei.html> [Accessed 13 April 2004]

[Corkscrew Swamp Sanctuary. UNDATED. Brown Anole \(exotic\) \*Anolis sagrei\* \*sagrei\*. Audubon Centers and Sanctuaries: Corkscrew Swamp Sanctuary s Common Lizards.](#)

**Summary:** Information on description, economic importance, distribution, habitat, history, growth, and impacts and management of species.

Available from: <http://www.audubon.org/local/sanctuary/corkscrew/Wildlife/Lizards.html> [Accessed 13 April 2004]

[eNature.com, 2007. Brown Anole, \*Anolis sagrei\*. Field Guide to Reptiles and Amphibians \[Online Database\].](#)

**Summary:** Information on description, economic importance, distribution, habitat, history, growth, and impacts and management of species.

Available from:

<http://www.enature.com/fieldguides/detail.asp?allSpecies=y&searchText=anolis%20sagrei&curGroupID=7&lgfromWhere=&curPageNum=1> [Accessed 11 February 2008]

[Frost, D.R. & Hammerson, G.A. 2007. \*Anolis carolinensis\*. In: IUCN 2007. 2007 IUCN Red List of Threatened Species.](#)

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[Greene, B. T., D. T. Yorks, J. S. Parmerlee, R. Powell, and R. W. Henderson. 2002. Discovery of \*Anolis Sagrei\* in Grenada with Comments on Its Potential Impact on Native Anoles. Caribbean Journal of Science 38\(3-4\): 270-272. College of Arts and Sciences at the University of Puerto Rico.](#)

**Summary:** Information on description, economic importance, distribution, habitat, history, growth, and impacts and management of species.

Available from: [http://academic.uprm.edu/publications/cjs/Vol38b/38\\_270-272.pdf](http://academic.uprm.edu/publications/cjs/Vol38b/38_270-272.pdf) [Accessed 11 February 2008]

[Horn, Scott; Hanula, James L. 2006. Burlap bands as a sampling technique for green anoles \(\*Anolis carolinensis\*\) and other reptiles commonly found on tree boles. Herpetological Review. 37\(4\). DEC 2006. 427-428](#)

**Summary:** Available from: [http://www.srs.fs.usda.gov/pubs/ja/ja\\_horn011.pdf](http://www.srs.fs.usda.gov/pubs/ja/ja_horn011.pdf) [Accessed 2 July 2010]

[Varnham, K. 2006. Non-native species in UK Overseas Territories: a review. JNCC Report 372. Peterborough: United Kingdom.](#)

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### General information

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[Campbell T. S. 2003. The introduced brown anole \(\*Anolis sagrei\*\) occurs in every county in peninsular Florida. Herpetol Rev 34:173-174](#)

[CONABIO. 2008. Sistema de informaci3n sobre especies invasoras en M3xico. Especies invasoras - Reptiles. Comisi3n Nacional para el Conocimiento y Uso de la Biodiversidad. Fecha de acceso.](#)

**Summary:** English:

The species list sheet for the Mexican information system on invasive species currently provides information related to Scientific names, family, group and common names, as well as habitat, status of invasion in Mexico, pathways of introduction and links to other specialised websites. Some of the higher risk species already have a direct link to the alert page. It is important to notice that these lists are constantly being updated, please refer to the main page (<http://www.conabio.gob.mx/invasoras/index.php/Portada>), under the section Novedades for information on updates.

Invasive species - reptiles is available from: [http://www.conabio.gob.mx/invasoras/index.php/Especies\\_invasoras\\_-\\_Reptiles](http://www.conabio.gob.mx/invasoras/index.php/Especies_invasoras_-_Reptiles) [Accessed 30 July 2008]

Spanish:

La lista de especies del Sistema de informaci3n sobre especies invasoras de m3xico cuenta actualmente con informaci3n acerca de nombre cient3fico, familia, grupo y nombre com3n, as3 como h3bitat, estado de la invasi3n en M3xico, rutas de introducci3n y ligas a otros sitios especializados. Algunas de las especies de mayor riesgo ya tienen una liga directa a la p3gina de alertas. Es importante resaltar que estas listas se encuentran en constante proceso de actualizaci3n, por favor consulte la portada (<http://www.conabio.gob.mx/invasoras/index.php/Portada>), en la secci3n novedades, para conocer los cambios.

Especies invasoras - Reptiles is available from: [http://www.conabio.gob.mx/invasoras/index.php/Especies\\_invasoras\\_-\\_Reptiles](http://www.conabio.gob.mx/invasoras/index.php/Especies_invasoras_-_Reptiles) [Accessed 30 July 2008]

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[Franz, Richard, 2001. Lacertilia: \*Anolis sagrei\* \(Brown anole\). Predation. Herpetological Review. 32\(4\). December, 2001. 252, 253](#)



# GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: *Norops sagrei*

Fulgar, Charles, M., 1968. The Distributional Status of *Anolis sagrei* in Central America and Northern South America. *Journal of Herpetology*, Vol. 1, No. 1/4 (Mar. 29, 1968), pp. 96-98

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Gerrut, N., J. J. Mao, H. P. Chu, and L. C. Chen. 2002. A new record of an introduced species, the brown anole (*Anolis sagrei*) (Dumeril and Bibron, 1837), in Taiwan. *Zoological Studies* 41(3): 332-336.

**Summary:** An account of species sighting in Taiwan.

Goldberg R. S., C. R. Bursey, and F. Kraus. 2002. *Seasonal Variation in the Helminth Community of the Brown Anole, Anolis sagrei* (Sauria: Polychrotidae), from Oahu, Hawaii. *American Midland Naturalist* 148:409-415.

**Summary:** A observational study on species

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Goldberg, Stephen R.; Kraus, Fred; Bursey, Charles R., 2002b. Reproduction in an introduced population of the brown anole, *Anolis sagrei*, from Oahu, Hawaii. *Pacific Science*. 56(2). April, 2002. 163-168

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Henderson, Robert W.; Powell, Robert, 2005. *Anolis sagrei* (Brown Anole). *Herpetological Review*. 36(4). DEC 2005. 467.

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[ITIS \(Integrated Taxonomic Information System\), 2005. Online Database \*Norops sagrei\*](#)

**Summary:** An online database that provides taxonomic information, common names, synonyms and geographical jurisdiction of a species. In addition links are provided to retrieve biological records and collection information from the Global Biodiversity Information Facility (GBIF) Data Portal and bioscience articles from BioOne journals.

Available from:

[http://www.cbif.gc.ca/pls/itisca/taxastep?king=every&p\\_action=containing&taxa=Norops+sagei&p\\_format=&p\\_ifx=plgt&p\\_lang=](http://www.cbif.gc.ca/pls/itisca/taxastep?king=every&p_action=containing&taxa=Norops+sagei&p_format=&p_ifx=plgt&p_lang=) [Accessed March 2005]

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**Summary:** A study detailing reproductive aspects of species.

Nicholson, K.E., A.V. Paterson, and P.M. Richards., 2000. *Anolis sagrei* (brown anole) cannibalism. *Herpetological Review* 31(3):173-174.

Nicholson, Kirsten E.; Paterson, Ann V.; Richards, Paul M., 2000. *Anolis sagrei* (Brown Anole). Cannibalism. *Herpetological Review*. 31(3). September, 2000. 173-174.

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**Summary:** Five hundred and two Brown anoles (*Anolis sagrei*) were collected for stomach content analysis from an area surrounding a plant nursery (23 degrees 25 51 N, 120 degrees 28 30 E) in Santzepu, Sheishan District, Chiayi County, as part of an ongoing study on this invasive species in Taiwan. The results of this study seem to indicate that male *A. sagrei* saurophagy is more likely in cleared open habitats, with no ground cover, than in habitats with ground covering. A stomach content study of five hundred and two Brown anoles (*Anolis sagrei*) in Santzepu, Sheishan District, Chiayi County, Taiwan

Norval, Gerrut; Bursey, Charles R.; Goldberg, Stephen R.; Tung, Chun-Liang; Mao, Jean-Jay, 2009. *Norops sagrei* (Brown Anole) Pathology and Endoparasite. *Herpetological Bulletin*.(107). SEP 2009. 42-44.

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**Summary:** The Mountain wolf snake (*Lycodon ruhstrati*) is a common snake species at low elevations all over Taiwan. Still, it appears to be poorly studied in Taiwan and adjacent areas since little has been reported about this species. On 2611, August 2002 ten *L. r. ruhstrati* eggs were obtained from an adult female, one of two that were caught a day before, and eight of the eggs hatched successfully on 1411 October 2002. While in captivity all the adults preyed upon *Anolis sagrei*, which were given to them as prey, while two neonates accepted *A. sagrei* hatchlings offered to them as food. On February 1811,, 2006, a DOR Mountain wolf snake, with an *A. sagrei* in its stomach, was found on a tarred road in Santzepu, Sheishan District, Chiayi County. This appears to be the first report from Taiwan of the Mountain wolf snake (*L. r. ruhstrati*) preying on the exotic introduced lizard *A. sagrei*.

[Norval G.; Mao J. J.; Chu H. P.; Chen L. C., 2002. A new record of an introduced species, the brown anole \(\*Anolis sagrei\*\) \(Dumeril & Bibron, 1837\), in Taiwan. \*Zool Stud\* 41:332-336](http://zoolstud.sinica.edu.tw/Journals/41.3/332.pdf)

**Summary:** Available from: <http://zoolstud.sinica.edu.tw/Journals/41.3/332.pdf> [Accessed 22 June 2010]

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Rogowitz, G. L. 1996. *Evaluation of Thermal acclimation of Metabolism in Two Eurythermal Lizards, Anolis cristatellus and A. sagrei*. *Journal of Thermal Biology* 21(1): 11-14.

**Summary:** A research paper that analyzes the adaptive abilities of the species.

Schoener, Thomas W.; Jonathan B. Losos and David A. Spiller, 2005. Island Biogeography of Population: an introduced species transforms survival pattern (Report) *Science* 310.5755 (Dec 16, 2005): p1807(3).

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**Summary:** A study containing general information about species

Tokarz, R. R., S. McMann, L. C. Smith, and H. J. Alder. 2002. *Effects of Testosterone Treatment and Season on the Frequency of Dewlap Extensions during Male-Male Interactions in the Lizard Anolis sagrei*. *Hormones and Behavior* 41: 70-79.

**Summary:** A study containing general information about species

Tokarz, R. R., S. McMann, L. Seitz, and H. John-Alder. 1998. Plasma corticosterone and testosterone levels during the annual reproductive cycle of male brown anoles (*Anolis sagrei*). *Physiological Zoology* 71:139-146.

[Townsend, H. Josiah; Kenneth L. Krysko; Anthony T. Reppas and Coleman M. Sheehay III., 2002. Noteworthy Records for Introduced Reptiles and Amphibians from Florida, USA. \*Herpetological Review\*, 2002, 33\(1\), 75.](#)

**Summary:** Available from: [http://www.naherpetology.org/pdf\\_files/41.pdf](http://www.naherpetology.org/pdf_files/41.pdf) [Accessed 22 June 2010]

[Treglia, Michael L.; Muensch, Alexander J.; Powell, Robert; Parmerlee, John S. Jr., 2008. Invasive Anolis sagrei on St. Vincent and its potential impact on perch heights of Anolis trinitatis. \*Caribbean Journal of Science\*. 44\(2\). 2008. 251-256.](#)

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**Summary:** A study containing general information about species

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