

# Primary key

1. Lamellae straight (Fig. 2A); inside of mouth orange or blue (Fig. 3A & B) 2  
Lamellae curved (Fig. 2B); inside of mouth pinkish (Fig. 3C) 5
2. Inside of mouth orange (Fig. 3A); body colour grey, brown or olive; scales on top and sides of snout markedly smaller than ear opening (Fig. 5C) 3  
Inside of mouth blue or purple (Fig. 3B); body colour bright green; many scales on top and sides of snout as large as ear opening (Fig. 5D)

**Jewelled gecko (*Naultinus gemmeus*)**

3. Supraciliary scales with domed tips; intact tail usually (but not always) shorter than SVL; yellow markings (if present) form small, discrete spots accompanied by orange spots; from rocky alpine habitats or high altitude forest in central/western Otago 4

Supraciliary scales with pointed tips; intact tail always longer than SVL; yellow colouration often suffused with body colour, or in large mustard-yellow patches, sometimes accompanied by red (but seldom orange) spots; from forested or shrubland habitats in south-eastern Otago

**Southern forest gecko**

**(*Hoplodactylus* sp. 'southern forest')**

4. Tongue colour bright orange all over (Fig. 13E)

**Roys Peak gecko (*H.* sp 'Roys Peak')**

Tongue predominantly pink or grey; orange colouration absent or restricted to tip or sides (Fig. 12D) **Takitimu gecko (*H. cryptozoicus*)**

5. Colour pattern uniform or striped, and the colouration along the middle of the back not or scarcely darker than the colouration along the lower edges of the flanks (Fig. 6A)

**Southern mini gecko (*H.* sp. 'southern mini')**

Colour pattern usually banded or blotched, but if striped then the colouration along the middle of the back is distinctly darker than the colouration along the lower edge of the flanks (Fig. 6B)

***H. maculatus* complex**

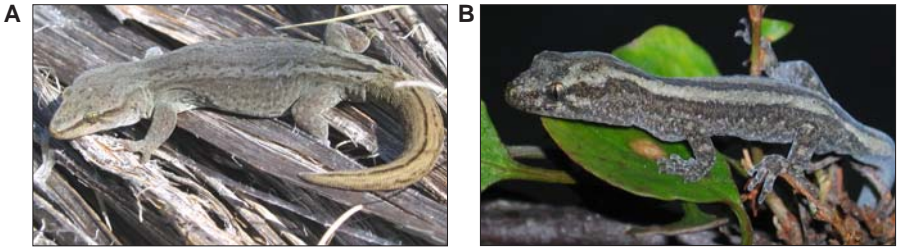


Figure 6. Colour patterns of the southern mini gecko (*Hoplodactylus* sp. 'southern mini') (A) and a striped example of the common gecko (*H. maculatus*) complex (B). For the southern mini gecko, note that the stripes are often less pronounced than this.

## Identifying the members of the *Hoplodactylus maculatus* complex

Four of the gecko species that occur in Otago are members of the *H. maculatus* (or 'common gecko') species-complex. The members of this group can be abundant in the dry, rocky regions of the South Island, particularly in Otago, where they are the most frequently encountered geckos. They also inhabit coastlines, forests and rocky alpine habitats.

We know that the members of this complex are distinct species because they differ clearly in genetic profile (illustrating a prolonged evolutionary independence), and can occur together in sympatry without interbreeding (Hitchmough 1997; Hitchmough et al. 1998). However, despite having evolved into reproductively isolated species, each continues to inhabit the same basic niche and has retained the same basic morphology. The *H. maculatus* group presents an

acute identification problem. Traditional morphology-based identification keys are ineffective at distinguishing the four Otago species because the differences between them are too subtle, overlap too frequently, and are too variable from one part of the region to the next.

Instead, an identification system is used that focuses on a combination of geographic origin and adult size. The three most similar species (the Central Otago, Cromwell and Southern Alps geckos) have very little overlap in distribution. The fourth species (the Otago/Southland large gecko) does frequently occur with, or close to, each of the above taxa, but where it does so it is always larger in adult size. Other morphological characters are used where possible, but again in combination with geographic origin to reduce the confusing influence of geographic variation.

To simplify the use of geographic origin, the Otago region has been divided into five areas in this guide; these are defined by river systems, lake margins, alpine ridge-lines and major roads. In the following pages, each area is addressed individually. The species recorded from each area are keyed out, and general notes are provided on factors relating to identification. A map illustrates the areas and indicates the distribution of each species within them (Fig. 7).

When using this system, if at all possible **work from a series of specimens**. This is very important, because in most cases the traits that distinguish the species are subtle and prone to minor variations that can easily produce an intermediate or overlapping state.

This identification system is not infallible. It is based on the state of knowledge as of August 2005, which is not comprehensive and will require refinement as new information becomes available. Workers requiring a 100% certain identification are encouraged to liaise with experts; in some cases, a definitive identification will require genetic data.

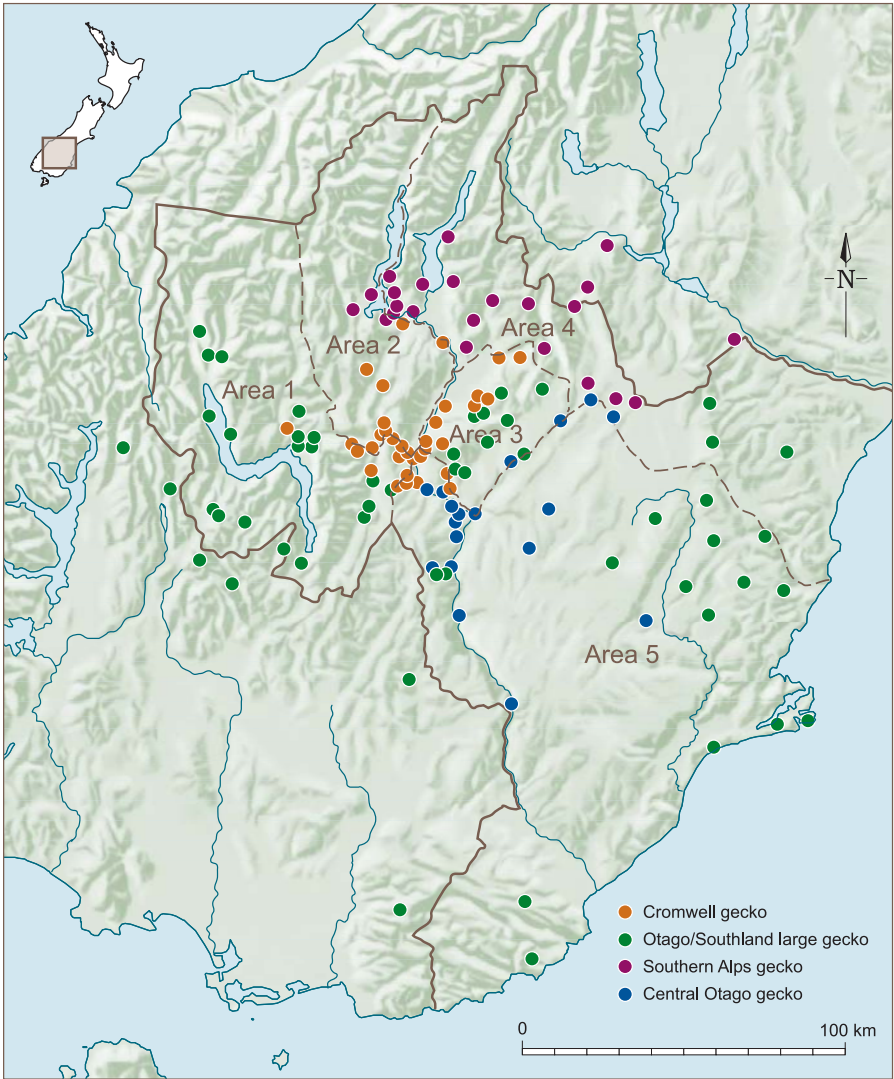


Figure 7. The distribution of five species of gecko in five areas in the Otago region. Distributions of the following species are presented: Cromwell gecko (*H. aff. maculatus* 'Cromwell'), Otago/Southland large gecko (*H. aff. maculatus* 'Otago/Southland large'), Southern Alps gecko (*H. aff. maculatus* 'Southern Alps') and Central Otago gecko (*H. aff. maculatus* 'Central Otago').

KEY TO THE *H. maculatus* COMPLEX  
IN SOUTH/WEST OTAGO

(Area 1—Fig. 7)

**Key to species**

1. Adult SVL up to 70 mm **2**  
Adult SVL 71–90 mm **3**
2. East of Lake Wakatipu and the Kingston-Lumsden road **Cromwell gecko**  
**(*H. aff. maculatus* ‘Cromwell’)**  
West of Lake Wakatipu and the Kingston-Lumsden road **Otago/Southland large gecko**  
**(*H. aff. maculatus* ‘Otago/Southland large’)**
3. From the northern end of the Hector Mountains and only up to 75 mm SVL **Cromwell gecko**  
**(*H. aff. maculatus* ‘Cromwell’)**  
From elsewhere, or if from the northern end of the Hector Mountains often clearly exceeding 75 mm SVL **Otago/Southland large gecko**  
**(*H. aff. maculatus* ‘Otago/Southland large’)**

**Notes**

These two species are very similar, but for the most part live in different areas. The adult size can overlap somewhat; therefore, if there is any uncertainty it is important to examine a series of specimens to establish the average SVL.

Where they have been observed together, living in sympatry or otherwise close to one another, the Otago/Southland large gecko always attains a larger average size (usually 75–85 mm SVL) than the Cromwell gecko (usually 65–70 mm SVL). Some smaller populations of the Otago/Southland large gecko (e.g. 68–74 mm SVL) have been recorded in western areas, well away from the known populations of Cromwell gecko.

## KEY TO THE *H. maculatus* COMPLEX IN NORTH/WEST OTAGO

(Area 2—Fig. 7)

### Key to species

1. From north of, or within, the Matukituki River valley, or from the area west of the Cardrona River *and* within 15 km of Lake Wanaka (including islands) **2**  
From elsewhere **Cromwell gecko**  
**(*H. aff. maculatus* ‘Cromwell’)**
2. Edge of iris brown or grey; precloacal pore series 22–27 pores wide; distal phalange narrow (Fig. 2D) **Cromwell gecko (*H. aff. maculatus* ‘Cromwell’)**  
Edge of iris light blue or green; precloacal pore series 17–21 pores wide; distal phalange usually tapering (Fig. 2C) **Southern Alps gecko**  
**(*H. aff. maculatus* ‘Southern Alps’)**

### Notes

Most specimens should key out correctly. However, one population of Southern Alps gecko has been found from near the mouth of Waterfall Creek, in which the iris lacks blue/green colouring and the pores may range up to 22 in number. To be certain, examine a series of individuals. Also check the SVL, as the populations of Southern Alps gecko from within this area (but excluding the island populations) seldom exceed 63 mm, whereas the Cromwell geckos here frequently reach 65–70 mm. It is thought that the two species may occur in sympatry in the Glendhu Bay/Diamond Lake/lower Motutapu areas, where size may be an important diagnostic trait.

Further away from Lake Wanaka, beyond the known range of the Southern Alps gecko, the Cromwell gecko becomes more variable, and may have a greenish colouring in the eye. Jewell & McFarlane (1997), Hitchmough et al. (1998) and Tocher & Marshall (2001) each provide field survey results and identification notes for the Wanaka area.

KEY TO THE *H. maculatus* COMPLEX  
IN THE DUNSTAN MOUNTAINS

(Area 3—Fig. 7)

**Key to species**

1. Adult SVL up to 68 mm (rarely reaches 70 mm)      2  
SVL 71 mm or greater (usually 73–82 mm)

**Otago/Southland large gecko**  
**(*H. aff. maculatus* ‘Otago/Southland large’)**

2. From within 5 km of the Manuherikia River

**Central Otago gecko**  
**(*H. aff. maculatus* ‘Central Otago’)**

From elsewhere

**Cromwell gecko**  
**(*H. aff. maculatus* ‘Cromwell’)**

**Notes**

The populations of Central Otago and Cromwell geckos within this area are often indistinguishable in external appearance, but appear to be isolated on either side of the rockless lowlands that abut the eastern flanks of the Dunstan Mountains. Within the Dunstan Mountains area, the Central Otago gecko appears to be restricted to rock outcrops near the Manuherikia River (i.e. in Alexandra, and between Chatto Creek and Omakau).

The Cromwell gecko ranges along the western faces of the Dunstan Mountains, from Clyde to Cluden Stream, and the Otago/Southland large gecko occurs mainly along the eastern faces. However, the distribution ranges of the two species overlap in the Cromwell and Thompson Gorges, between about 600 and 1100 m a.s.l.

KEY TO THE *H. maculatus* COMPLEX  
IN NORTHERN OTAGO

(Area 4—Fig. 7)

**Key to species**

1. Adult SVL up to 71 mm (usually 50–68 mm);  
occurring west of the Kyeburn-Duntroon Road      2  
Adult SVL 72–85 mm or, if smaller, from east of the  
Kyeburn-Duntroon Road

**Otago/Southland large gecko**

**(*H. aff. maculatus* ‘Otago/Southland large’)**

2. Distal phalange usually narrowing abruptly from the  
lamellar pad (Fig. 2D); adult SVL commonly  
attaining 65–68 mm; under-surface usually grey with  
darker grey flecks; only known from below  
1100 m a.s.l.      3

Distal phalange usually tapering gradually from pad  
to claw (Fig. 2C); usually only 53–60 mm SVL (but  
some populations above 1100 m a.s.l. may grow  
larger); under-surface usually very pale and uniform;  
can range well above 1100 m a.s.l.

**Southern Alps gecko**

**(*H. aff. maculatus* ‘Southern Alps’)**

3. From west of Dunstan Creek      4  
From east of Dunstan Creek      **Central Otago gecko**  
**(*H. aff. maculatus* ‘Central Otago’)**

4. From the area south of Goodger Road and east of the  
Lindis River; pore series 3–4 pores deep  
**Cromwell gecko (*H. aff. maculatus* ‘Cromwell’)**

From outside the above area, or if from within this  
area the pore series is only two pores deep

**Southern Alps gecko**

**(*H. aff. maculatus* ‘Southern Alps’)**



## Notes

Identification in this area is problematic due to the very complicated patterns of distribution contact combined with a high degree of morphological variability in the Southern Alps gecko. Further, the exact distribution limits of species in some areas (e.g. between Goodger Road and Cluden Stream) have yet to be documented.

Most specimens of Southern Alps gecko are readily distinguished by the combination of small adult size (i.e. 53–60 mm SVL) and a short, tapering distal phalange. In addition, the markings tend to be very drab, and often include pinkish tones. This is especially true of populations that live among greywacke. However, in some locations with schist rock, such as the hills to the west of the Lindis Valley, individuals may have a narrower distal phalange and brighter markings, which can lead to confusion with the Cromwell gecko. Around the head of Cluden Stream, the two species abut in range, with the Southern Alps gecko found among greywacke screes and the Cromwell gecko in schist outcrops. Here they are readily distinguished by the features given in the key.

The Central Otago gecko appears to be confined to schist rock outcrops in the Ida Burn area, where it is readily distinguished from the neighbouring populations of Southern Alps gecko by the under-surface colour, which is mid-grey with dark grey flecks (versus very pale and uniform).

The Otago/Southland large gecko is particularly variable within this zone, occurring in three forms that were once thought to be separate species (Daugherty et al. 1994; see pp. 34–37 of this guide). Those found in close proximity to other members of the *H. maculatus* complex (in the Dunstan Mountains and in the Kye Burn area) are distinctly larger in size than the Central Otago, Cromwell and Southern Alps geckos. However, in the Kakanui Mountains, where they are isolated from other species, adults (i.e. gravid females) have measured as little as 63 mm SVL.

KEY TO THE *H. maculatus* COMPLEX  
IN EASTERN OTAGO

(Area 5—Fig. 7)

**Key to species**

1. From the Cairnmuir/Old Woman Ranges area, north of the Fraser River and west of the Clutha River    2  
From elsewhere    4
2. Adult SVL up to 71 mm (typically 60–68 mm)    3  
SVL 73–85 mm    **Otago/Southland large gecko**  
**(*H. aff. maculatus* ‘Otago/Southland large’)**
3. Eye frequently yellow or greenish-yellow (but can be brown); body colour usually brown (but can be grey)    **Central Otago gecko**  
**(*H. aff. maculatus* ‘Central Otago’)**  
Eye colour never yellow (but may be green); body colour usually grey or olive-grey (but can be brown)    **Cromwell gecko (*H. aff. maculatus* ‘Cromwell’)**
4. From north of the Gore-Balclutha Road    5  
From south of the Gore-Balclutha Road    **Otago/Southland large gecko**  
**(*H. aff. maculatus* ‘Otago/Southland large’)**
5. Adult SVL up to 71 mm (usually 53–68 mm); eye pale golden-brown or yellow-brown to dark brown or greenish; so far known only from west of the Kokonga-Taieri Mouth section of the Taieri River    **Central Otago gecko**  
**(*H. aff. maculatus* ‘Central Otago’)**  
Adult SVL usually 73–85 mm, but specimens from east of the Kokonga-Taieri Mouth section of the Taieri River occasionally smaller (especially so near the coast); eye brown or yellow, at times bright lemon-yellow    **Otago/Southland large gecko**  
**(*H. aff. maculatus* ‘Otago/Southland large’)**

## Notes

The Central Otago and Cromwell geckos must inevitably meet up somewhere in the Cairnmuir and Old Woman Ranges, but this contact zone has yet to be examined. The key outlines subtle differences between the populations that have been examined to date, but identification problems are very likely where these near-identical species meet.

The Central Otago and Otago/Southland large geckos have been found living together in the Old Man Range, where they appear to overlap widely in distribution; adult size provides a clear point of difference.

A population at Glenavon (near Middlemarch) is somewhat intermediate between the Central Otago gecko and Otago/Southland large gecko (see 'Notes' on p. 29). At this stage it is unclear whether this population can be reliably distinguished from either species.

# Overview of the species

## CENTRAL OTAGO GECKO

*Hoplodactylus* aff. *maculatus* 'Central Otago'  
(Hitchmough, unpublished)

### Size

53-71 mm SVL (usually 60-68 mm).

### Colour

The majority of specimens are mid- to dark brown or olive-brown, with paler bands or blotches, but significant variation is not uncommon in some populations. Specimens coloured olive-green, straw-brown, light to dark grey and even yellowish have been found, and some are partially or fully striped. The under-surface is light grey, often with darker grey flecks. The eye may be light to dark brown, grey-brown or yellowish, and sometimes has a greenish tint. Mouth colour is pink. (See Fig. 8A-D.)

### Build

Often somewhat flattened in appearance, but not always so. The toe-pads are only slightly expanded, with curved lamellae, and the distal phalange is narrow in shape.

### Distribution

Found between the Old Man and Rock & Pillar Ranges. Peripheral records include the southern end of the Cairnmuir Range, Omakau (west of the Manuherikia River), the Raggedy Range and North Rough Ridge, Roxburgh, and Beaumont (north of the Clutha River).

### Habitat

Lives among schist rock tors and outcrops from the lowlands up to 1100 m a.s.l. Retreat sites are rock crevices and beneath loose slabs of rock.

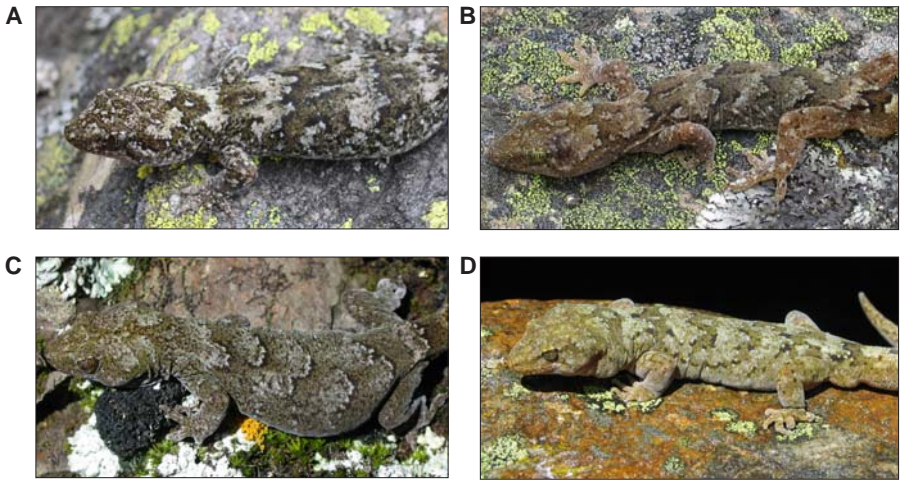


Figure 8A-D. Various colour forms of the Central Otago gecko (*Hoplodactylus* aff. *maculatus* 'Central Otago').

### Behaviour

Secretive by day, but often sun basks from within (or very close to) crevices. Emerges at night onto open rock surfaces or amongst low, dense vegetation such as pohuehue (*Muehlenbeckia* spp.), bush-lawyer (*Rubus* spp.), porcupine scrub (*Meliccytus alpinus*) or *Coprosma* spp.

### Notes

The Central Otago gecko is abundant throughout most of its range, and is especially common around Alexandra, where it even occurs in some residential areas where suitable rock outcrops remain.

A population of geckos at Glenavon (near Middlesmarch) is outwardly similar to the Central Otago gecko, but genetic evidence indicates a possible hybrid origin, between this species and the Otago/Southland large gecko (R.A. Hitchmough, DOC, pers. comm. 2004). At the time of writing, it is unclear how widespread this form is and whether it can be reliably distinguished.