Russian Journal of Herpetology Vol. 00, No. ??, 20??, pp. 1 – 14

# TWO NEW SPECIES OF ANGULAR-TOED GECKOES (SQUAMATA: GEKKONIDAE) FROM SOUTH IRAN

**Roman Nazarov,[1] Natalia Ananjeva,[2*] and Mehdi Radjabizadeh[3]**

*Submitted March 12, 2008.*

Two new species of *Cyrtopodion* genus belonging to «*agamuroides – gastrophole*» group are described from South Iran. The first one, *Cyrtopodion golubevi* sp. nov., was collected in Sistan Baluchestan Province in South-East Iran. This species is different from other Iranian *Cyrtopodion* sensu lato by size, coloration and pholidosis characters, and similar to *C. gastrophole* in several characters (enlarged subcaudal plates, less number of ventral scales at midbody). The second species, *Cyrtopodion persepolense* sp. nov. is originated from Fars Province in South-West Iran and closely resembles *C. gastrophole* but differs by subcaudal scalation: lack of enlarged median series of subcaudal plates and higher number of scales across the middle of belly (26 – 35 vs. 16 – 18).

**Keywords:** Gekkonidae, *Cyrtopodion*, South Iran, new species, distribution, taxonomy.

## INTRODUCTION

Steven Anderson was the first specialist who paid special attention to «*agamuroides – gastropholis*» group in his monograph "The lizards of Iran" and marked it out among others angular-toed geckos of Iran. We continued study of these lizards and now it becomes obvious that "*agamuroides – gastropholis*" group is the large complex of species. According to our tentative estimations it can additionally includes 8 – 10 non-described cryptic species from southern Iran and Pakistan.

During fieldwork in the South Iran we found two species referred to the genus *Cyrtopodion* sensu lato. Comparative study shows that these lizards differ from the other Iranian species of this genus in a number of morphological characters. In this manuscript, we describe two new species belonging to «*agamuroides – gastrophole*» group.

[1] Zoological Museum, Moscow State University, B. Nikitskaya 6, Moscow 103009, Russia; E-mail: r_nazarov@mail.ru

[2] Zoological Institute, Russian Academy of Sciences, Universitetskaya nab. 1, St. Petersburg 199034, Russia; E-mail: azemiops@zin.ru

[3] Department of Biology, Faculty of Science, Shahid Beheshti University, Evin Tehran, Iran; E-mail: Khosro.rajabizadeh@gmail.com

* Address correspondence and reprint requests to: Natalia Ananjeva, Zoological Institute, Russian Academy of Sciences, Universitetskaya nab. 1, St. Petersburg 199034, Russia; E-mail: azemiops@zin.ru

In our considerations we follow the simplified generic arrangement of angular-toed geckos of South and Central Asia used by Anderson (1999). We refer these new species of angular-toed geckos to the genus *Cyrtopodion* without allocating of subgenera.

## MATERIAL AND METHODS

Type specimens of new species: *Cyrtopodion golubevi* sp. nov. (9) and *Cyrtopodion persepolense* sp. nov. (11) are deposited in the collections of Zoological Museum of M. V. Lomonosov Moscow State University, Moscow, Russia (ZMMU); Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia (ZISP); Museum of Vertebrate Zoology, California University at Berkeley, CA, USA (MVZ); and University of Florida, FL, USA (UF). For morphological description and comparison we examined collections of ZMMU, ZISP, MVZ, and UF.

For morphological analysis the following characters were used: snout-vent length (SVL, from snout to vent); tail length (Lcd, from vent to the tip of the tail); head length (HeadL, from rostrum to occipital sinus); head width (HeadW, maximum width); head height (HeadH, maximum height); snout to eye distance (SnEye, distance between anterior most point of eye and tip of snout); orbital diameter (OrbD, greatest diameter of or-

1026-2296/20??/000??-0001 © 20?? Folium Publishing Company

**Fig. 1.** *Cyrtopodion golubevi* sp. nov.

bit); ear length (EarL, longest dimension of ear); eye to ear distance (EyeEar, distance from anterior edge of ear opening to posterior corner of eye); trunk length (TrunkL, distance from axilla to groin measured from posterior edge of forelimb insertion to anterior edge of hindlimb insertion); shoulder length (LS); forearm length (ForeaL, from base of palm to elbow); femur length (FemurL); crus length (Crus L, from base of heel to knee); fourth finger length (LD4A), fourth toe length (LD4P). Measurements were taken with a dial calipers to the nearest 0.1 mm.

Furthermore, the following characters of pholidosis were used: number of scales across middle of belly (SAB); number of midventral scales along belly (SLB, between mental and vent); number of subdigital lamellae on fourth finger (SDL4A); number of subdigital lamellae on fourth toe (SDL4P); number of preanal pores (PP); number of supralabials (SL); number of infralabials (IL); number of longitudinal rows of enlarged tubercles in the middle of dorsum between ventrolateral folds (TubL); number of transversal rows of enlarged tubercles between occiput and middle of sacrum along the middle of dorsum (TubW); number of scales along the middle of head, between occiput and supranasales (SLH); scales across head, between top of ear openings (SAH).

***Cyrtopodion golubevi* sp. nov.** (Fig. 1)

**Holotype.** ZMMU R-12624 — Iran, Sistan-Baluchestan Province, 100 km NW from Iranshehr, near Bazman. 27°52′ N 60°06′ E, 1060 m a.s.l., coll. Roman A. Nazarov May 04, 2005.

**Paratypes (8). ZMMU** R-12625-1, 12625-2, 12625-3; **ZISP** 25208, 25209; UF 152538 — Iran, Sistan-Baluchestan Province, 100 km NW from Iranshehr, near Bazman. 27°52′ N 60°06′ E; 1060 m a.s.l. 04 May 2005, coll. Roman A. Nazarov; **MVZ** 234359, 234360 — Iran, Sistan-Baluchestan Province, Al Maff, 11 km W (by road) Bazman. 27°52.58′ N 60°05.73′ E; 1100 m a.s.l., coll. Theodore J. Papenfuss, May 05, 2001.

Measurements of holotype and 8 paratypes are presented in Table 1.

**Diagnosis.** Snout-vent 43.3 – 59 mm, tail 53 – 79 mm; snout blunt-pointed, very big eyes; rounded smooth dorsal tubercles forming 10 longitudinal rows at midbody, 23 – 26 tubercles in the row (from occiput to the middle of sacrum); tail with segments, that were formed by semi-rings of enlarged weakly keeled roundish tubercles, subcaudal plates in single median series, wider than height, not bifurcate in the tip of non-regenerated tail; 22 – 30 abdominal scales across middle of belly, 115 – 141 midventral scales along belly. Males have 3 – 6 (usually 4) highly pronounced preanal pores in a regular row on enlarged scales. 8 – 11 infralabial scales, 12 – 14 supralabial. Mental plate is large, three pairs of submentals scales, first pair in broad contact. Nasal shields noticeably swollen (Fig. 5). Limbs and tail are very thin and attenuate. There are 6 – 8 transverse dark narrow bands on the dorsum, interspaces between which bigger to the width of bands; tip of tail light or white, without transverse bends.

**Description of holotype.** ZMMU R-12624 (RAN 316) — Adult male. Snout-vent length 47.5 mm. Head relatively long (HeadL/SVL ratio 0.27), not wide (HeadW/HeadL ratio 0.7), not depressed (HeadH/HL ratio 0.45), distinct from slender neck. Snout not elongate (SnEye/HeadL ratio 0.4), blunt-pointed, longer than eye diameter (OrbD/SnEye ratio 0.58); scales on snout and forehead small, rounded, granular, homogeneous; scales on snout larger than those on occipital region.

Eye large (OrbD/HeadL ratio 0.23); pupil vertical with crenellated margins; supraciliaries short, bearing tiny conical spines posteriorly. External auricular opening is small (EarL/HeadL ratio 0.08) oval, vertical;

eye to ear distance larger than diameter of eye (EyeEar/OrbD ratio 1.06).

Width of rostral scale (1.4 mm) is larger than its height (0.9 mm); it is divided to the middle by longitudinal groove.

Two supranasals are separated by one large scale; rostral in contact with first supralabial, two supranasals and scale between them; nostrils round, each surrounded by supranasal, rostral, first supralabial, and two enlarged postnasals, about the same size as supranasals. Nasal shields noticeably swollen (Fig. 2).

One row of small scales separates orbit from supralabials. Mental triangular, its height (1.8 mm) and width (1.8 mm) are equal; 3 pairs of enlarged postmentals, first pair in broad contact (Fig. 3); supralabials 12; infralabials 9.

Trunk is slightly flattened and elongated (TrunkL/SVL ratio 0.46) with weakly developed ventrolateral folds. Dorsal trunk surface is covered with small granular to weakly conical scales. Among them rounded smooth tubercles (4 – 5 times bigger than adja-

**Fig. 2.** Snout of the *C. golubevi* with big eye and swollen nasals.

**TABLE 1.** Measurements of the Type Series of *Cyrtopodion golubevi* sp. nov.

| Character | Holotype | Paratypes | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | ZMMU R-12624 | UF 152538 | ZMMU R-12625-1 | ZMMU R-12625-2 | ZISP 25209 | ZISP 25208 | ZMMU R-12625-3 | MVZ 234359 | MVZ 234360 |
| Sex | ♂ | ♂ | ♂ | ♂ | juv. | ♀ | ♀ | ♀ | ♂ |
| SVL | 47.5 | 52 | 52.4 | 53.5 | 26.1 | 59 | 56.7 | 54.3 | 54 |
| Lcd | 56.7 | 51.2 | 63 | 74 | 31.5 | 79 | 70 | 74 | 58 |
| HeadL | 13 | 13.8 | 13.8 | 14 | 8.8 | 15.7 | 14.2 | 14.6 | 14.2 |
| HeadW | 8.4 | 8.8 | 8.7 | 9 | 6.5 | 10 | 9.5 | 9.3 | 8.9 |
| HeadH | 5.8 | 5.8 | 5.7 | 5.8 | 3.4 | 5.8 | 5.8 | 5.9 | 5.3 |
| SnEye | 5.2 | 5.5 | 5.5 | 5.4 | 3.2 | 6.1 | 5.8 | 5.5 | 5.5 |
| OrbD | 3 | 3.7 | 3.4 | 3.5 | 2.2 | 3.8 | 3.7 | 3.6 | 3.6 |
| EarL | 1 | 1 | 1 | 1.3 | 0.5 | 1.4 | 1.4 | 1.4 | 1.2 |
| EyeEar | 3.2 | 3.2 | 3.3 | 3.2 | 1.8 | 3.8 | 3.6 | 3.7 | 3.6 |
| TrunkL | 21.7 | 26 | 25.8 | 25 | 10.9 | 29.5 | 28.9 | 27 | 25.2 |
| LS | 10.2 | 11 | 11 | 11 | 5.8 | 11.6 | 11 | 11 | 11 |
| ForeaL | 9.3 | 10.7 | 10.9 | 10.8 | 5.5 | 11.5 | 11 | 10.5 | 10.3 |
| FemurL | 13.2 | 15.2 | 15.4 | 15.2 | 7.5 | 15.8 | 15 | 15.8 | 15.6 |
| Crus L | 12.2 | 13.6 | 13.6 | 13.7 | 6.8 | 14.2 | 14.3 | 13.8 | 14.3 |
| LD4A | 5.6 | 6.4 | 6 | 6.2 | 3.5 | 6.5 | 6.2 | 5.6 | 5.9 |
| LD4P | 6.8 | 7.5 | 7.3 | 7.2 | 4.6 | 8.5 | 7.9 | 7.7 | 7.6 |
| SAB | 26 | 25 | 24 | 27 | 28 | 28 | 27 | 27 | 22 |
| SLB | 123 | 115 | 120 | 124 | 120 | 126 | 124 | 123 | 141 |
| SDL4A | 18 | 21 | 21 | 20 | 20 | 20 | 20 | 17 | 17 |
| SDL4P | 25 | 22 | 24 | 24 | 22 | 23 | 23 | 20 | 21 |
| PP | 4 | 6 | 4 | 4 | 0 | 0 | 0 | 0 | 4 |
| SL | 12 | 12 | 12 | 14 | 13 | 14 | 13 | 14 | 13 |
| IL | 9 | 11 | 11 | 11 | 11 | 10 | 11 | 9 | 8 |
| TubL | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| TubW | 23 | 23 | 25 | 25 | 23 | 24 | 24 | 23 | 26 |
| SLH | 47 | 50 | 49 | 50 | 49 | 51 | 50 | 45 | 45 |
| SAH | 51 | 52 | 46 | 50 | 48 | 49 | 52 | 43 | 44 |

**Fig. 3.** Mental scalation of *C. golubevi* sp. nov.

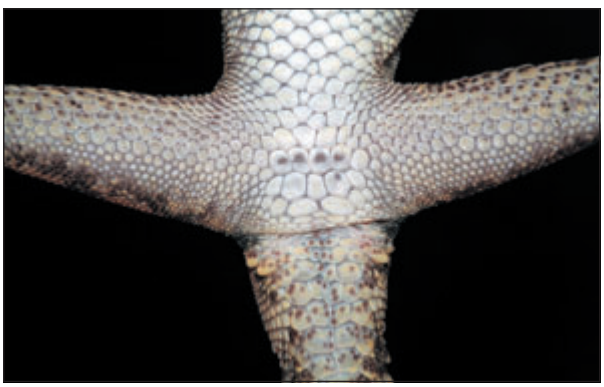

**Fig. 4.** Anal region with 4 preanal pores and enlarged preanal scales of the holotype *C. golubevi* sp. nov.

**Fig. 5.** Subcaudal scalation of *C. golubevi* sp. nov. (basal part and tip of the tail).

cent scales) extending from occipital region on to back and tail base are regularly distributed; tubercles in approximately 10 rows at midbody, absent from flanks.

Ventral scales much larger than dorsal, smooth, subimbricate, with rounded free margins; in precloacal region scales larger then in midbelly; 26 abdominal scale rows across middle of belly to base of ventrolateral folds; 123 midventral scales along belly; gular region with relatively homogeneous, smooth scales.

Scales containing 4 preanal pores are larger then surrounding ones; no femoral pores, enlarged femoral scales and subfemoral tubercles (Fig. 4).

Fore and hindlimbs very long, thin and slender (ForeaL/SVL ratio 0.53; CrusL/SVL ratio 0.68); digits are moderately long and thin; on IV finger there are 18 subdigital lamellae; on IV toe there are 25 subdigital lamellae.

Original tail long, thin, slender, gently tapering to tip; longer than snout vent length (TailL/SVL ratio 1.19); tail with pronounced segments, that were formed by semi-rings of roundish weakly keeled tubercles, inferior tail surface is covered with single median series of wide subcaudal plates (Fig. 5).

**Etymology.** The species is named in honor of famous Soviet herpetologist Mikhail N. Golubev, for his great contribution to the studies of Palaearctic geckos.

**Coloration.** The ventral surface is white; there are 6 – 8 transverse dark bands on the dorsum. There are 6 – 9 dark stripes on tail, interspaces between which are some bigger or equals to the width of stripes themselves. Tip of the tail is light or white without transverse dark bands. The head pattern is usually not clearly pronounced and formed by small dark spots of irregular form. There is a dark stripe in both sides of occipital region from back edge of eye above auricular opening. Sometimes this stripe comes apart into separate spots and may not be clearly pronounced. Dorsum coloration is light gray.

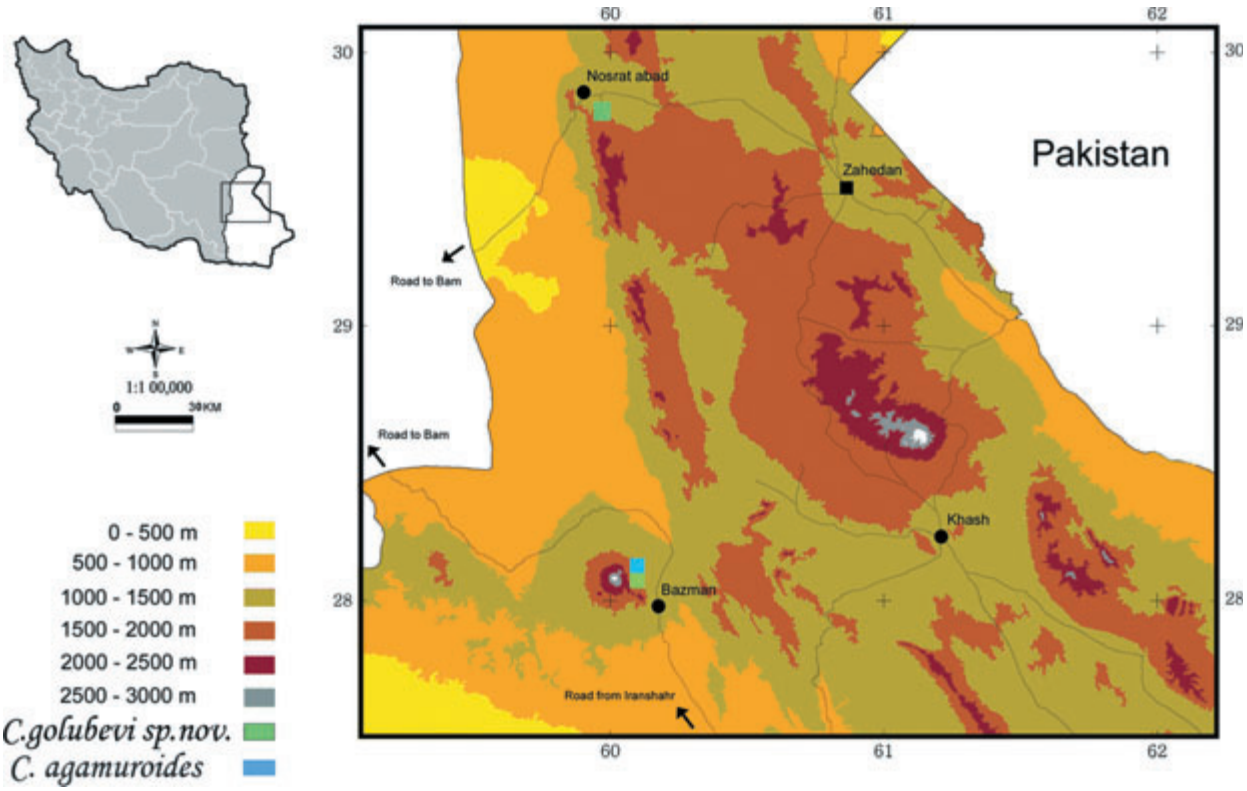


**Fig. 6.** Distribution of *C. golubevi* sp. nov.

**Distribution.** Apparently, this species is distributed in South Iran, likely to be found in bordering regions of Pakistan as well. (Fig. 6)

**Comparison.** The comparison *C. golubevi* with other angular-toed geckos inhabiting this region is given in Table 4.

From *C. agamuroides* (Nik.) a new species is clearly distinct with only one row of enlarged subcaudal plates (2 plates for a tail segment) and with 4 preanal pores. From other *Cyrtopodion* species *C. golubevi* is clearly different with very long and thin limbs, thin tail and relatively high head with big eyes.

**Natural history.** The biotope of *C. golubevi* is represented by very dry low clayey hills with poor shrubby vegetation typical for South Iran. They were mainly compounded by sedimentary.

In Bazman area habitat slightly differs from the type locality. It represents more humid canyon with rather dense shrub vegetation. One of the canyon's sides was formed by clayey hills composed by sedimentary soil with rocky outcrops (Fig. 7).

Geckos inhabit vertical surfaces with plenty of shelters. We registered these nocturnal lizards just after the sunset and during the whole night; activity was decreased in the midnight. In the same biotope we found following sympatric reptile species: *Trapelus agilis* (Oliver 1804); *Laudakia nupta* (De Filippi, 1843); *Mesalina watsonana* (Stoliczka, 1872); *Eumeces schneideri zarudnyi* (Nikolsky, 1900); *Cyrtopodion sistanensis* Nazarov, Rajabizadeh 2007; *Pseudocerastes persicus* (Duméril and Bibron, 1854); and *Coluber* (*Platyceps*) *rhodorachis* (Jan, 1865).

Since 2005 we keep a group of these geckoes in captivity, the species is easy to breed in laboratory; in 2007 a second generation of captive-bred geckoes was obtained. Copulation in terrarium was observed in March – April, 1 – 2 eggs are normally laid in the period from the end of April till July. Eggs are usually laid in 2 weeks after the copulation (Figs. 8 and 9). Eggs have following dimensions: 10.8 to 11.8 mm (D) and 8 to 8.8 mm (d) in diameter. Incubation takes from 42 to 60 days from laying to hatchling. Hatchlings have total length (L) from 22 to 25 mm and tail length from 27 to 30 mm. In the nature geckoes reach maturity to the next breeding season if they hatched in June – July or the year after if they hatched in the end of summer.

These geckoes demonstrate a special way of locomotion — they run on their thin long limbs with body

**Fig. 7.** Habitat of *C. golubevi* sp. nov. in Bazman mountain, Sistan-Baluchistan province, Iran.

lifted up over the substrate, both during movement over horizontal or vertical surfaces.

***Cyrtopodion persepolense* sp. nov.** (Fig. 10)

**Holotype.** ZMMU R-12626, — South Iran, Fars Province, 60 km N-E from Shiraz, Takht-e-Jamshid (Persepolis). 29°55′ N 52°53′ E, 590 m a.s.l., coll. Roman A. Nazarov May 05, 2005.

**Paratypes (10).** ZMMU R–12627-1, 12627-2, 12627-3, 12627-4, 12627-5, 12627-6, ZISP 25212, 25213, 25214, 25215 — South Iran, Fars Province, 60 km N-E from Shiraz, Takht-e-Jamshid (Persepolis). 29°55′ N 52°53′ E, 590 m a.s.l., coll. Roman A. Nazarov May 05, 2005.

**Diagnosis.** Snout-vent SVL 33.7 – 51 mm, tail Lcd 39 – 55 mm; rounded smooth dorsal tubercles forming 10 – 12 longitudinal rows at midbody, number of tubercles in the row (from occiput to the middle of sacrum) is 25 – 30; tail with segments, that were formed by semi-rings of enlarged keeled tubercles, subcaudals are bifurcated, two pairs in per tail segment; 28 – 35 abdominal scales across middle of belly, 114 – 132 midventral scales along belly. Males have 2 – 6 (usually 4) highly pronounced preanal pores that are located in a regular row on enlarged scales. 9 – 11 infralabial scales, 10 – 12 supralabial. Scales on the interior femur side are homogeneous and small. Mental plate is large, 3 pairs of submentals scales, first pair separated by small scale or contact in point. Limbs and tail thin and attenuate.

**Description of holotype.** ZMMU R-12626. Adult male. Snout-vent length 37 mm. Head relatively long (HeadL/SVL ratio 0.3), not wide (HeadW/HeadL ratio 0.66), not depressed (HeadH/HeadL ratio 0.4), distinct from slender neck. Snout not elongate (SnEye/HeadL ratio 0.38); longer than eye diameter (OrbD/SnEye ratio 0.65); scales on snout and forehead small, rounded,

**Fig. 8.** Copulation of *C. golubevi* in captivity.

**Fig. 9.** Hatchling of *C. golubevi* sp. nov.

granular, homogeneous; scales on snout same larger than those on occipital region.

Eye large (OrbD/HeadL ratio 0.25); pupil vertical with crenellated margins; supraciliaries short, bearing tiny conical spines posteriorly. External auricular opening is small (EarL/HeadL ratio 0.08) oval, vertical; eye to ear distance more than diameter of eye (EyeEar/OrbD ratio 0.93).

**Fig. 10.** *Cyrtopodion persepolense* sp. nov.

Width of rostral scale (1.3 mm) is more than its height (0.8 mm); it is divided till the middle by longitudinal groove.

Supranasals are separated by two scales (Fig. 11); rostral in contact with first supralabial, two supranasals and scales between them; nostrils round, each surrounded by supranasal, rostral, first supralabial, and two enlarged postnasals, about the same size as supranasals. Nasal shields are not swollen (Fig. 12);

Mental triangular, height (1.7 mm) and width (1.7 mm) are equal; three pairs of enlarged postmentals, first pair separated by one small scale (Fig. 13); supralabials 12; infralabials 10.

Trunk is slightly flattened and elongated (TrunkL/SVL ratio 0.48) with developed ventrolateral folds. Dorsal trunk surface is covered with small granular to weakly conical scales. Among them rounded smooth tubercles (4 – 5 times size of adjacent scales) are regularly distributed extending from occipital region on

**Fig. 11.** Nasal scalation with divided supranasal.

to back and tail base in approximately 10 rows at midbody and absent on flanks.

Ventral scales larger than dorsals, smooth, subimbricate, with rounded free margins; in precloacal region scales larger then in midbelly; 28 abdominal scale rows across middle of belly to base of ventrolateral folds; 132 midventral scales along belly; gular region with relatively homogeneous, smooth scales.

Scales containing 4 preanal pores are larger then surrounding ones; no femoral pores, enlarged femoral scales and subfemoral tubercles (Fig. 14). Fore and hindlimbs long thin and slender (ForeaL/SVL ratio 0.53; CrusL/SVL ratio 0.68); digits are moderately long and thin; on IV finger are 18 subdigital lamellae; on IV toe are 21 subdigital lamellae.

**TABLE 2.** Measurements of the Type Series of *Cyrtopodion persepolense* sp. nov.

| Character | Holotype | Paratypes | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ZMMU R-12626 | ZMMU R-12627-1 | ZMMU R-12627-2 | ZISP 25212 | ZISP 25213 | ZMMU R-12627-3 | ZISP 25214 | ZMMU R-12627-4 | ZISP 25215 | ZMMU R-12627-5 | ZMMU R-12627-6 |
| Sex | ♂ | ♀ | ♀ | ♀ | ♀ | ♂ | ♀ | ♂ | ♂ | ♂ | ♂ |
| SVL | 37 | 51 | 42 | 50 | 33.7 | 34.2 | 38.6 | 43.7 | 45.2 | 37.3 | 44 |
| Lcd | 41.5 | 20 | 30 | 25 | 39 | 41 | 45.8 | 45.7 | 16.7 | 22.2 | 45 |
| Head L | 11.2 | 13.8 | 12.4 | 13.7 | 10.2 | 10.2 | 11.2 | 12.9 | 13.1 | 11.1 | 12 |
| Head W | 7.4 | 9.2 | 8.1 | 9.5 | 6.5 | 6.5 | 7.2 | 8.3 | 8.5 | 6.9 | 8.3 |
| Head H | 4.5 | 5.8 | 5 | 5.4 | 3.8 | 4 | 4.3 | 4.8 | 4.8 | 4.1 | 5.3 |
| SnEye | 4.3 | 5 | 4.3 | 5.1 | 3.6 | 3.6 | 4 | 4.8 | 4.8 | 4 | 4.7 |
| OrbD | 2.8 | 2.9 | 2.7 | 3.2 | 2.4 | 2.4 | 2.7 | 3.2 | 3 | 2.7 | 3 |
| EarL | 0.9 | 1.1 | 1 | 1.1 | 1 | 1 | 0.9 | 1.2 | 1.1 | 1 | 1 |
| EyeEar | 2.6 | 3.6 | 3 | 3.2 | 2.4 | 2.6 | 2.8 | 2.8 | 2.9 | 2.4 | 2.8 |
| TrunkL | 18 | 26.6 | 19.3 | 25.3 | 16 | 16.2 | 19.5 | 20 | 19.2 | 16.7 | 20.8 |
| LS | 7.9 | 8.8 | 9.3 | 9.8 | 6.3 | 6.6 | 7 | 8.9 | 9 | 7.7 | 8.8 |
| ForeaL | 7.2 | 8.4 | 7.6 | 8.2 | 5.8 | 5.8 | 6.5 | 7.8 | 8.4 | 6.4 | 7.5 |
| FemurL | 10.8 | 13.4 | 12 | 13.2 | 9.8 | 10 | 10.5 | 12.1 | 12.2 | 10 | 12.2 |
| Crus L | 9.1 | 11.6 | 10.2 | 10.4 | 7.9 | 8 | 9.4 | 10.5 | 10.5 | 8 | 10.7 |
| LD4A | 4.7 | 5.4 | 5.5 | 5.2 | 4 | 4.5 | 4.5 | 4.6 | 5 | 4.8 | 5.5 |
| LD4P | 6 | 6.2 | 6.5 | 6.3 | 5.3 | 5.4 | 5.7 | 7.4 | 6.7 | 5.5 | 7.2 |
| SAB | 28 | 29 | 28 | 32 | 30 | 30 | 30 | 29 | 32 | 30 | 31 |
| SLB | 132 | 125 | 114 | 126 | 124 | 116 | 127 | 129 | 123 | 125 | 128 |
| SDL4A | 18 | 17 | 18 | 17 | 16 | 16 | 17 | 18 | 18 | 19 | 18 |
| SDL4P | 21 | 22 | 21 | 22 | 21 | 21 | 20 | 23 | 21 | 22 | 22 |
| PP | 4 | 0 | 0 | 0 | 0 | 4 | 0 | 4 | 4 | 4 | 4 |
| SL | 11 | 10 | 11 | 12 | 12 | 12 | 12 | 11 | 12 | 11 | 12 |
| IL | 10 | 9 | 10 | 10 | 10 | 10 | 10 | 11 | 10 | 11 | 11 |
| TubL | 10 | 12 | 10 | 12 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| TubW | 27 | 29 | 27 | 25 | 28 | 28 | 30 | 25 | 26 | 27 | 27 |
| SLH | 44 | 40 | 40 | 42 | 38 | 39 | 40 | 38 | 41 | 38 | 42 |
| SAH | 36 | 37 | 36 | 34 | 36 | 34 | 38 | 38 | 38 | 39 | 38 |

Original tail long, slender, gently tapering to tip; longer than snout-vent length (TailL/SVL ratio 1.12); tail with pronounced segments, that were formed by semi-rings of weakly keeled tubercles; subcaudal plates are bifurcated, two pairs per tail segment, in the ultimate one-third of non-regenerated tail the subcaudal scales are bifid (Fig. 15).

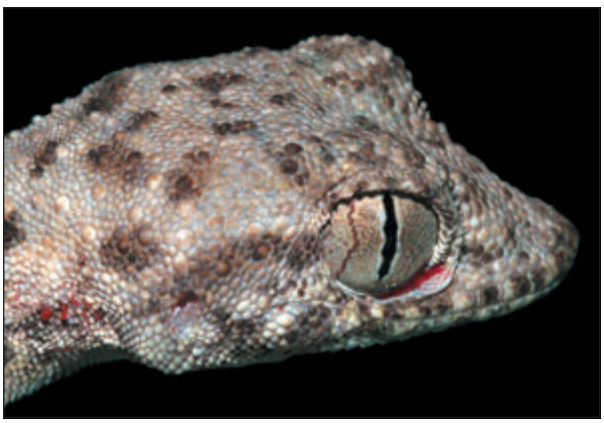

**Fig. 12.** Snout of the *C. persepolense* sp. nov., nasals are not swollen.

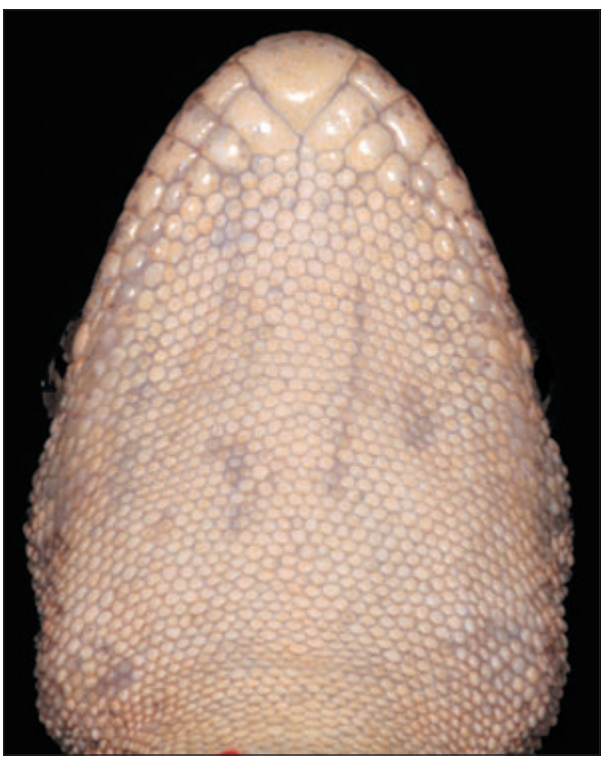

**Fig. 13.** Mental scalation of *C. persepolense* sp. nov.

**Etymology.** The species is named after the name of the type locality.

**Coloration.** The ventral surface is white; there are 6 – 8 transverse M-shaped dark bands on dorsum, each

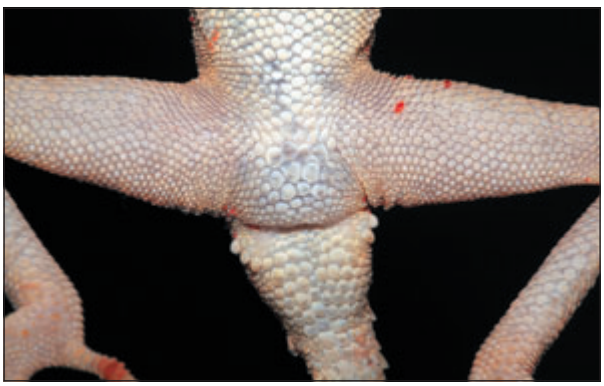

**Fig. 14.** Anal region with 4 preanal pores of *C. persepolense* sp. nov., enlarged femoral scales is absent.

**Fig. 15.** Bifurcated subcaudal plates on the basal and tip of tail.

**Fig. 16.** Distribution of *C. persepolense* sp. nov.

consisting of three confluent spots. There are 9 – 12 dark stripes on tail, interspaces between which are some larger or equals to the width of stripes themselves. The head pattern is formed by small dark spots of irregular form. There is a close-cut dark stripe from back edge of eye above auricular opening. Dorsum coloration is brownish-gray.

**Distribution.** Known with certainty only from the type locality in the Persepolis, Fars Province, South Iran.

It is very likely that will be new findings of this species within the Fars province (Fig. 16). It is interesting to study sympatric zones of this species with *C. gastrophole* and other members of this species complex.

**Comparison.** The comparison *Cyrtopodion persepolense* with other angular-toed geckos inhabiting this region is given in Table 4.

This species is most similar to *C. gastrophole* but differs by subcaudal scales (there are no enlarged median series of subcaudal plates) and number of scales across middle of belly (26 – 35 versus 16 – 18). *C. persepolense* differs from *C. golubevi* by smaller size, bifurcate subcaudals, coloration and others characters of pholidosis.

We find three different groups of subcaudal scalation among species of *agamuroides – gastrophole* complex: the first group is characterized by small homogeneous subcaudal scales which form three rings per segment (*C. agamuroides*), the second group has bifurcated subcaudal plate, two pairs per segment (*C. persepolense*), and the third group has large wide subcaudal plate, two pairs per segment of tail (*C. golubevi* and *C. gastrophole*).

**Natural history.** We registered these nocturnal lizards just after the sunset and during night. Geckos inhabit vertical surfaces with plenty of shelters (Fig. 17). In the same biotope we found following sympatric reptiles: *Laudakia nupta nupta* (De Filippi, 1843), *Mabuya aurata septemtaeniata* (Reuss, 1834), *Echis carinatus* (Schneider, 1801), *Tropiocolotes latifi* Leviton and An-

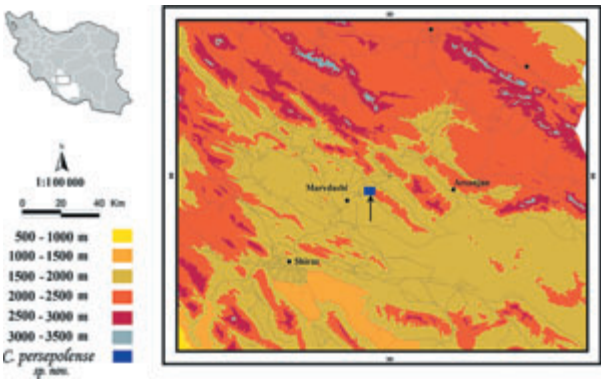


**Fig. 17.** Habitat *C. persepolense* sp. nov. in Takht-e-Jamshd (Persepolis), Fars province, Iran.

**Fig. 18.** Lectotype of *C. agamuroides* (ZISP 9327).

derson, 1972, *Eryx jaculus* (Linnaeus, 1758), *Telescopus* cf. *tesselatus* (Wall, 1908), and *Leptotyphlops macrorhynchus* (Jan, 1860).

**Discussion.** *Cyrtopodion golubevi* was identified by the majority of herpetologists as *Cyrtopodion agamuroides* (Nikolsky 1900). It led to the following collision: *Gymnodactylus agamuroides* was described by Nikolsky in 1900 by 3 specimens that were brought by Zarudnyi in 1898 from SE Persia (ZISP 9326 — Neizar in Seistano. May 26, 1898; ZISP 9327 — Pendsch-Sara in Kirmano orient. August 10, 1898 (Figs. 18 – 22); ZISP 9328 — Duz-ab in Kirmano orient. June 14, 1898 (Fig. 23).

By note of Michael V. Golubev (1985) the first type specimen (ZISP 9326) was lost. The second one (ZISP 9328) was redefined by the same author as a juvenile *Agamura persica*. Some characters of this specimen (very long limbs, conical tubercles and longitudinal row of widened subcaudal scales) were included in species diagnosis of *G. agamuroides*. Detailed description and

**Fig. 19.** Snout of *C. agamuroides* (ZISP 9327).

**Fig. 20.** Mental scalation of *C. agamuroides* (ZISP 9327).

photograph of lectotypus *C. agamuroides* (ZISP 9327) can be seen in monograph of N. Szczerbak and M. Golubev (1986:196 – 197).

The only remaining type specimen of *G. agamuroides* (ZISP 9327) has a number of characters (moderately long limbs, roundish-triangular dorsal tubercles with poorly develop keels, 2 preanal pores located at very large scales, absence of enlarged subcaudals), which were not inserted into diagnosis of *agamuroides*.

**Fig. 21.** Anal region with tow preanal pores and tow enlarged preanal scales of the *C. agamuroides* (ZISP 9327).

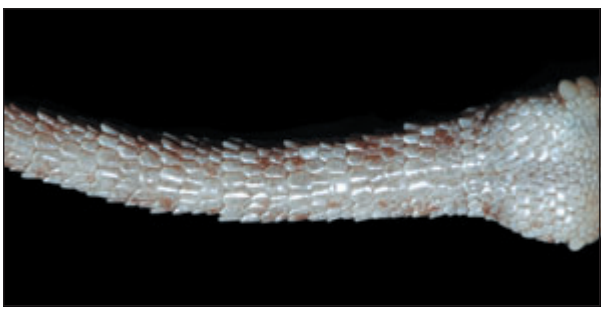

**Fig. 22.** Subcaudal scalation of *C. agamuroides* (ZISP 9327).

**Fig. 23.** *C. golubevi* sp. nov., ZISP 9328.

The specimen ZISP 9328 was noted in the monograph of Nikolai N. Szczerbak and Michael L. Golubev (1986, 1992 p. 208) as *Agamura persica* "*cruralis*" and ZISP 9327 was declared as lectotype of *Tenuidactylus agamuroides*.

**TABLE 3.** Measurements of *C. agamuroides* (Nikolsky, 1900)

| Character | Lectotype | Topotypes | |
|---|---|---|---|
| | ZISP 9327 (♂) | RAN 315 (♂) | CAS 141075 (♂) |
| SVL | 38.7 | 39.4 | 44.2 |
| Lcd | 49.1 | 40 reg. | 53 |
| Head L | 12.3 | 11.5 | 12.6 |
| Head W | 7.5 | 7.4 | 7.9 |
| Head H | 5.3 | 4.6 | 5.3 |
| SnEye | 4.4 | 4.1 | 4.7 |
| OrbD | 2.8 | 3.2 | 3.2 |
| EarL | 0.9 | 0.9 | 1.2 |
| EyeEar | 2.8 | 3 | 3.2 |
| TrunkL | 16.8 | 16.7 | 20 |
| LS | 7 | 7.4 | 8.7 |
| ForeaL | 6.9 | 6.8 | 8 |
| FemurL | 9.6 | 10.5 | 11.4 |
| Crus L | 8.7 | 8.3 | 10.5 |
| LD4A | 4.4 | 4.2 | 4 |
| LD4P | 5.6 | 5.6 | 6 |
| SAB | 28 | 29 | 38 |
| SLB | 120 | 120 | 130 |
| SDL4A | 20 | 17 | 19 |
| SDL4P | 21 | 19 | 21 |
| PP | 2 | 2 | 2 |
| SL | 14 | 14 | 14 |
| IL | 10 | 11 | 10 |
| SLH | 44 | 45 | 47 |
| SAH | 40 | 40 | 44 |

Examination of specimen ZISP 9328 led us to conclusion that the author's identification was erroneous and this specimen does not refer to *Agamura persica* (difference in body proportions and pholidosis). We believe that this specimen must be referred to *agamuroides – gastrophole* group of genus *Cyrtopodion* sensu lato but not to genus *Agamura*. Comparison with specimens from Iran collected by us in 2005 allows to conclude that this specimen (ZISP 9328) is *C. golubevi*.

In April 2005 we collected male of *C. agamuroides* (RAN 315) in the type locality of this species — Panjsareh village, near Bazman mount, Sistan-Baluchestan Province, SE Iran. (Fig. 24). This specimen fully corresponds to the lectotype ZISP 9327. The measurements of 2 specimens of *C. agamuroides*, known with certainty only from the type locality, are given in Table 3. The specimen CAS 141075 identified as *C. agamuroides* has some differences in body proportions and pholidosis characters (especially in subcaudal scalation) from the type specimen. We suppose that this specimen also belongs to *agamuroides – gastrophole* group, but probably not to *C. agamuroides* sensu stricto.

**TABLE 4.** Comparison of Morphological Data of Palaearctic Angular-Toed Geckos from Iran and Neighboring Countries

| Species | Characters | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| *C. agamuroides* (Nikolsky, 1900) | 40/50 | 28 – 30/120 | 2 | 10 – 12 | M | 3 | 2C-D | 7/13 |
| *C. golubevi* sp. nov. | 59/79 | 23 – 28/115 – 126 | 4 | 10 | S | 2 | 2 – 3C | 5 – 7/7 – 8 |
| *C. gastrophole* (Werner, 1917) | 50/55 | 16/90 | 4 | 10 | S | 2 | 3C- D | 6 – 7/5 – 7 |
| *C.* cf. *gastrophole* | 50/63 | 30 – 37/124 – 136 | 4 – 5 | 10 – 12 | S | 2 | 3C – D | 6 – 7/5 – 7 |
| *C. persepolense* sp. nov. | 50/55 | 26 – 35/114 – 132 | 4 | 10 – 12 | D | 2 | 3D | 6 – 8/10 – 13 |
| *C. sistanensis* Nazarov, Radjabizadeh 2007 | 57/78 | 31 – 44/120 – 156 | 6 | 14 – 15 | S | 2 | 3 – 4C | 5 – 8/11 – 12 |
| *C. potoharensis* Khan, 2001 | 52/64 | 25 – 35/121 – 145 | 5 – 12 | 12 – 15 | S | 2? | (?) | 5 – 8/10 – 12 |
| *C. watsoni* (Murray, 1892) | 53/63 | 30 – 40/140 – 170 | 5 – 9 | 12 – 13 | S | 2 | 2 – 3C | 5 – 8/10 – 12 |
| *C. kachhensis* (Stoliczka, 1872) | 46/45 | 28 – 35/100 – 128 | 4 – 8 | 12 – 14 | D | 3 | 3C | 4 – 5/7 – 10 |
| *C. k. ingoldbyi* (Khan, 1997) | 53/65 | 32 – 40/149 – 156 | 4 – 6 | 14 – 16 | D | 3 | 3C | 4 – 6/7 – 10 |
| *C. scaber* (Heyden, 1827) | 53/62 | 16 – 23/85 – 120 | 4 – 7 | 12 – 13 | S | 2 | 2 – 3C | 5 – 8/7 – 10 |
| *C. brivipes* (Blanford, 1874) | 44/ | 20 – 22/(?) | 4 | 10 | S | 2? | (?) | 8/12 |
| *C. baigii* Masroor, 2008 | 46/58 | 30 – 32/125 – 132 | 2 | 10 | M | 3 | 3C | 8/10 – 12 |
| *C. kirmanensis* (Nikolsky, 1900) | 49/65 | 26 – 30/120 – 132 | 4 | 8 – 10 | D-M | 3 | 3 – 4C | 8/10 |
| *C. sagittifer* (Nikolsky, 1899) | 32/40 | 19 – 24/83 – 98 | 4 | 10 – 12 | D | 2 | 1 – 2C | 5 – 7/10 – 12 |
| *C. russowii zarudnyi* (Nikolsky, 1900) | 34/45 | 25/102 | 2 | 10 – 12 | | 2 | 2D | 6 – 8/10 – 12 |

**Note.** 1, Snout -vent length/tail length (mm); 2, scales across middle of belly/midventrals; 3, preanal pores; 4, number of longitudinal rows of dorsal tubercles; 5, subcaudal (M, small scales; S, single row of transversally enlarged subcaudals; D, double row of subcaudals); 6, number of subcaudal scale rows per segment; 7, postmentals (C, first pair in contact; D, first pair divided); 8, number of transverse dark bands on the dorsum/tail.

*Cyrtopodion persepolense* seems to be very close to the *C. gastrophole*. We had a chance to examine several samples of *Cyrtopodion* cf. *gastrophole* from Kazerun, Basht, Fasa and Persepolis (all localities from Fars province). All studied specimens have much smaller scales on the ventral surface of the body than the original *gastrophole*, 26 – 35 scales across the midbody instead of 16 – 19; moreover, the specimens from Persepolis had bifurcated subcaudal scales. Werner (1917) in his description of *Gymnodactylus gastropholis* mentioned Fars province of Iran as the type locality without specifying the exact place of sample origin. Unfortunately, tails of the most type specimens of *C. gastropholis* were lost. Thus just one type specimen with intact tail is known — syntype ZFMK 27095 (the photo is kindly provided by Dr. W. Böhme, see Fig. 25). Basing on the analysis of this type specimen we were able to examine the structure of subcaudal scales of the original *C. gastrophole*.

One more short remark about *C. persepolense*: in the Anderson's book "The lizards of Iran" (1999) one specimen of *C. kirmanense* FMNH 210007 (p. 161) from Persepolis is mentioned. The author indicates that he has some doubts concerning identification of this specimen and assumes that it might be the member of the *agamuroides – gastrophole* species group. We studied this specimen and totally agree with Anderson's opinion, assigning it as *C. persepolense* sp. nov.

**Fig. 24.** *C. agamuroides* RAN 315, topotype. Bazman mountain, Sistan-Baluchistan province, Iran.

We consider the *agamuroides – gastrophole* group as the complex of closely related species to which we also assign the two hereby described forms based on the following distinctive characters: relatively longer and thinner limbs, high rounded head, large eyes, not very long but thin tail and small number of preanal pores. We assume that several new species might be found in the nearest future, most probably from the southern areas of Iran and Pakistan.

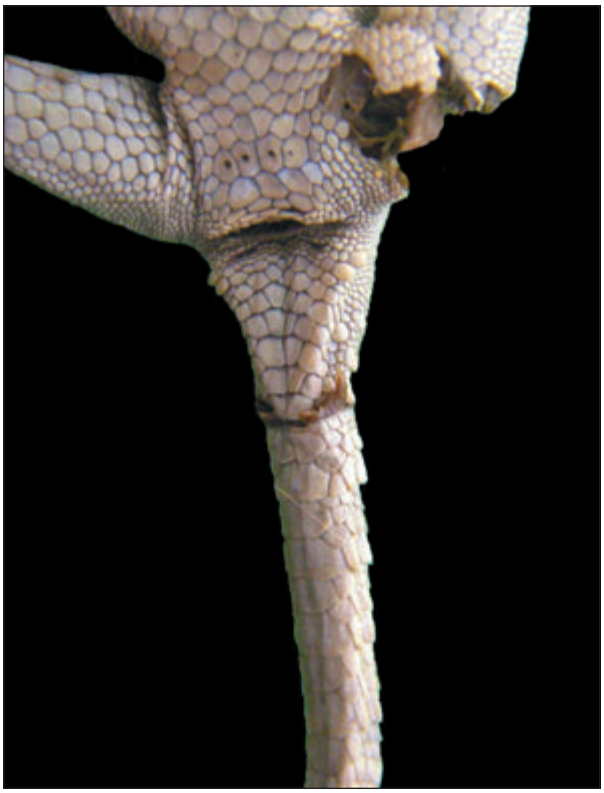

**Fig. 25.** Subcaudal scalation of syntype of *C. gastrophole*, ZFMK 27095 (photo by Dr. Böhme).

**Acknowledgments.** Our research was partially supported by Grant of the President of the Russian Federation NS 119.2008.4 and RFFI (grant No. 09-04-00132). We would like to thank the Iran Department of Environment that made possibility the fieldwork, especially Mr. Aramanesh and his colleague, Mr. Zahedi Asadipur, Arbabi, and Mudi in Department of Sistan-Baluchestan Province and Mr. Motesharei in Muze Melli Tarikh Tabiei (MMTT, Iran). We also thank Steven Anderson and Jens Vindum (CAS), Ted Papenfuss, Carol Spenser (MVZ), Kenneth L. Krysko (UF), and Wolfgang Böhme (ZFMK) providing us museum specimens for this study, Nikolai Orlov, Konstantin Milto (Zoological Institute, St. Petersburg, ZISP, Russia) and Muhammad Khan (Secane, PA, USA) for pertinent literature and the examination of specimens under their care. We thank Valentina Orlova (ZMMU), Evgenyi Dunaev (ZMMU), and Nikolai Poyarkov (Moscow State University) for their permanent assistance and approval by preparation of the manuscript. Also many thanks to the first author's friends Alexei Polilov and Alexei Tikhanov for theirs help in a fieldwork.

## REFERENCES

**Anderson S. C.** (1999), *The Lizards of Iran*, Soc. for the Study of Amphibians and Reptiles, pp. 185 – 190.

**Baig K. J.** (1998), "A new species of *Tenuidactylus* (Sauria: Gekkonidae) from Balochistan, Pakistan," *Hamadryad*, **23**(2), 127 – 132.

**Golubev M. L.** (1985), "Relationships of Palearctic geckos of the genus *Tenuidactylus* Szczerbak et Golubev, 1984 and genus *Agamura* Blanford, 1874," in: *Voprosy Gerpetologii* [*Problems of Herpetology*]. *Abstrs. of the 6th All-Union Heretol. Conf.*, Tashkent [in Russian].

**Khan M. S.** (1980a), "New species of gecko from northern Pakistan," *Pakistan J. Zool.*, **12**(1), 11 – 16.

**Khan M. S.** (1988), "A new cyrtodactylid gecko from northwestern Punjab, Pakistan," *J. Herpetol.*, **22**(2), 241 – 243.

**Khan M. S.** (1993), "A new angular-toed gecko from Pakistan, with remarks on the taxonomy and a key to the species belonging to genus *Cyrtodactylus* (Reptilia: Sauria: Gekkonidae)," *Pakistan J. Zool.*, **25**, 67 – 73.

**Khan M. S.** (2001), "Taxonomic notes on angulate-toed gekkota of Pakistan, with description of a new species of genus *Cyrtopodion*," *Pakistan J. Zool.*, **33**, 13 – 24.

**Khan M. S.** (2003), "Questions of generic designation of angular-toed geckos of Pakistan with description of three new genera (Reptilia: Gekkonidae)," *J. Nat. Hist. Wildlife* (*Karachi*), **2**(2), 1 – 9.

**Khan M. S.** (2003), "Anmerkungen zur Morphologie, Verbreitung und den Habitatpräferenzen einiger pakistanischer Geckos," *Sauria*, **25**(3), 35 – 47.

**Macey J. R., Ananjeva N. B., Wang Y., and Papenfuss T. J.** (2000), "Phylogenetic relationships among Asian gekkonid lizard formerly of the genus *Cyrtodactylus* based on cladistic analyses of allozymic data: monophyly of *Cyrtodactylus* and *Mediodactylus*," *J. Herpetol.*, **32**(2), 258 – 265.

**Nikolsky A. M.** ["1899" (1900)], "Reptiles, amphibiens et poissons, recueillis pendant le voyage de Mr. N. A. Zarudny en 1898 dans ia Perse," *Ann. Mus. Zool. l'Acad. Imp. Sci. St. Petersbourg*, **4**, 375 – 417 [in Russian].

**Szczerbak N. N. and Golubev M. L.** (1986), "Geckos of the USSR fauna and adjoining countries," *Nauch. Trudy Zool. Inst. AN UkrSSR*, **1986**, 1 – 232, [in Russian] [(1996) *Gecko Fauna of the USSR and Contiguous Regions*, Soc. Study Amph. Rept., English translation].

**Zarydny N. A.** (1904), "O gadakh i rybakh vostochnoy Persii. Gerpetologicheskiye i ikhtiologicheskiye rezul'taty ékskursii po vostochnoy Persii v 1898 g. [Les reptiles, amphibians et poisons de la Perse orintale. Materiaux herpetologiques et ichthyologiques du voyage fait en 1898]," *Mem. Soc. Imp. Russe Geogr. Geogr. Gen.*, **36**(3), 1 – 42 [in Russian].

**Werner F.** (1917), "Reptilien aus Persien (Provnz Fars) gesammelt von Herrn. Prof. Andreas," *Verh. Zool.-Bot. Ges. Wien*, **67**, 191 – 220.