Revista Ibérica de Aracnología, nº **37** (31/12/2020): 257–258.
Grupo Ibérico de Aracnología (S.E.A.). ISSN: 1576 - 9518.

Eye malformation in the spider *Phonotimpus pennimani* (Araneae: Phrurolithidae)

David Chamé-Vázquez[1] & Maria Luisa Jiménez[2]

[1] Colección de Arácnidos del Sureste de México, El Colegio de la Frontera Sur (ECOSUR), Tapachula, Chiapas, 30700, México. chamevazquez@gmail.com
[2] Laboratorio de Aracnología y Entomología, Centro de Investigaciones Biológicas del Noroeste (CIBNOR), La Paz, Baja California Sur, 23096, México. ljimenez04@cibnor.mx

Abstract: Here we report the first case of eye malformation in the guardstone spider *Phonotimpus pennimani* Chame-Vázquez, Ibarra-Núñez & Jiménez, 2018, being the first record of ocular anomaly in the family Phrurolithidae.
Key words: Araneae, Phrurolithidae, teratology, ocular anomalies, Mexico.

Un caso de malformación ocular en la araña *Phonotimpus pennimani* (Araneae: Phrurolithidae)
Resumen: Registramos el primer caso de malformación ocular en la araña *Phonotimpus pennimani* Chamé-Vázquez, Ibarra-Núñez & Jiménez, 2018 siendo el primer registro de anomalías oculares para la familia Phrurolithidae.
Palabras clave: Araneae, Phrurolithidae, teratología, anomalías oculares, México.

The quality vision in spiders is highly variable; the size, the structure and the arrangement of eyes affect the performance of the vision. Most spiders have eight eyes, but some groups have six, four or two eyes and some groups have lost the eyes (Barth, 2002; Ubick *et al.*, 2005). Moreover, the number and the arrangement of eyes is usually diagnostic for some families (Ubick *et al.*, 2005). Morphological malformations have recorded in several families of spider, cases include malformations of male and female genitalia, chelicerae and eyes (Jiménez & Llinas, 2002; Tomić *et al.*, 2016; Yaginuma, 1966), yet the biological and non-biological factors causing these anomalies are not know (Jiménez & Llinas, 2002; Napiórkowska *et al.*, 2015). Ocular anomalies are more frequent than other malformations, and these anomalies are shown as reduction in eye size or as absence of one or more eyes (Jiménez & Llinas, 2002; Ono & Kudo, 1996). All North American phrurolithids have eight eyes in two rows (Richman, 2017). *Phonotimpus pennimani* Chamé-Vázquez, Ibarra & Jiménez 2018 is a small ground dweller spider, which inhabit in the leaflitter of coffee plantations in Chiapas, México (Chamé-Vázquez *et al.*, 2018), and it has the typical eight eyes in two rows. Until now, there is not previous record of ocular malformations in Phrurolithidae; therefore, here we describe the first case. One specimen was observed under compound microscope, submerged in a dish petri with sand and alcohol 80% .The photographs were taken with Nikon D5200 camera attached to a Nikon E400 compound microscope, and we followed the categories of ocular malformations of Jiménez & Llinas (2002). Locality coordinates were taken with a portable GPS device (Garmin eTrex 20, datum WGS84). The specimen was deposited in Colección de Arácnidos del Sureste de México, Chiapas, Mexico (ECOTAAR, G. Ibarra-Núñez).

The teratological specimen is a female collected at the type locality with the following data: *P. pennimani* Chamé-Vázquez, Ibarra & Jiménez, 2018. 1♀: MEXICO. Chiapas, Municipio de Cacahoatán, Ejido Alpujarras (15.07243°N, -92.16583°W; 922m a.s.l.), hand collecting, 13 February 2017. Chamé, D. *leg*. The specimen studied lacks the right anterior lateral eye, and the right anterior median eye is smaller than the left one (Figs. 1-2). This anomaly fits in the "AALE" category of Jiménez & Llinas (2002), which means "absence of anterior lateral eye".

Two families were included in the same "AALE" category: Lycosidae (with four cases) and Philodromidae (with one case). Among Dionycha, where Phrurolithidae is included, the occurrences of ocular malformations were found only in Gnaphosidae and Clubionidae. Surprisely, most of these anomalies have been found in some genera of Lycosidae (Jiménez & Llinas, 2002; Kaston, 1982) because they are mainly active at night and could be more exposed to injuries or illness during juvenile states. The influence of ocular anomalies in the behavior of any spider is unknown although it can be negligible (González-Moliné, 2008; Jiménez & Llinas, 2002), since all the spiders do not rely only on visual signals. Furthermore, most spiders rely more in vibratory and chemical signals cues than visual ones to sense their world (Andrews *et al.*, 2007; Foelix, 2011).

Acknowledgements
G.M. Suarez (ECOSUR) helped us with image acquisition. DCV was supported by a graduate scholarship from Consejo Nacional de Ciencia y Tecnología, Mexico (CONACYT).

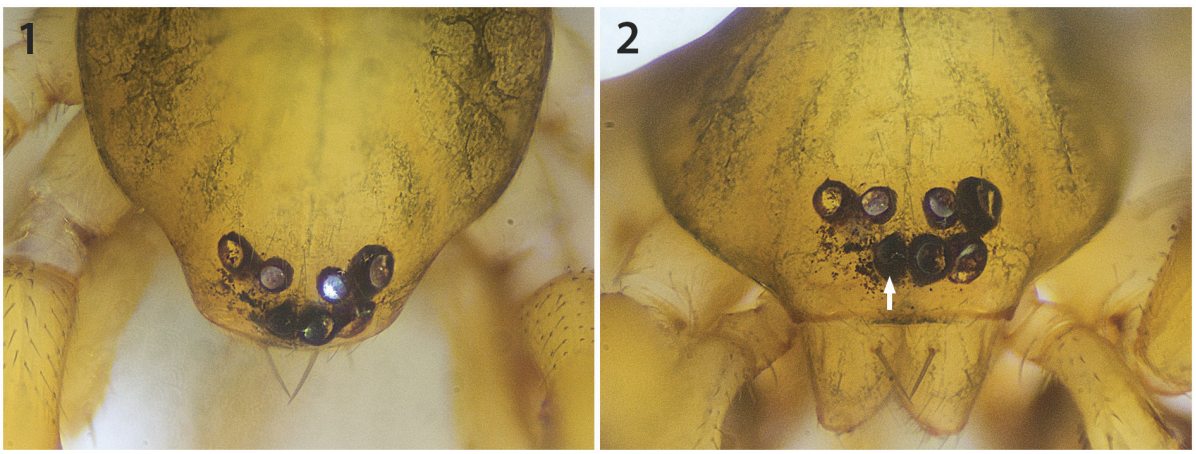


Fig. 1-2. Ocular malformation in *Phonotimpus pennimani*, **1**. Dorsal view. **2**. Dorso-frontal view, arrow point the right anterior median eye reduced in size.

References

ANDREWS, K., S. M. REED & S. E. MASTA 2007. Spiders fluoresce variably across many taxa. *Biology letters*, **3**(3): 265-267.

BARTH, F. G. 2002. *A spider's world: senses and behavior*. Heidelberg, Springer Berlin Heidelberg, New York. 394 pp.

CHAMÉ-VÁZQUEZ, D., G. IBARRA-NÚÑEZ & M.L. JIMÉNEZ 2018. Redescription of *Phonotimpus separatus* Gertsch & Davis, 1940 (Araneae: Phrurolithidae) and description of two new species of *Phonotimpus* from Mexico. *Zootaxa*, **4407**(2): 213-228.

FOELIX, R. 2011. *Biology of spiders*. Oxford University Press, USA, New York, 419 pp.

GONZÁLEZ-MOLINÉ, A. L. 2008. Anomalía ocular en *Macrothele calpeiana* (Walckenaer, 1805) (Araneae, Hexathelidae). *Boletin Sociedad Entomológica Aragonesa*, **42**: 397-398. Available at www.sea-entomologia.org

JIMÉNEZ, M. L. & J. LLINAS 2002. Revision of ocular anomalies in epigean spiders (Arachnida: Araneae) with notes of four records. *Anales del Instituto de Biología, Universidad Nacional Autónoma de México*, *Serie Zoología*, **73**(2): 241-250.

KASTON, B. J. 1982. Additional ocular anomalies in spiders. *Journal of Arachnology*, **10**: 279-281.

NAPIÓRKOWSKA, T., P. NAPIÓRKOWSKI & J. TEMPLIN 2015. Morphological and anatomical changes related to leg anomalies in *Tegenaria atrica*. *Zoomorphology*, **134**(2): 237-245.

ONO, H. & Y. KUDO 1996. The ocular anomaly in a ground spider (Araneae: Gnaphosidae) from Japan. *Acta Arachnologica*, **45**: 73-75.

RICHMAN, D. B. 2017.Phrurolithidae. Pp 213-214, in Ubick, D., Paquin, P., Cushing, P. E. & V. Roth (eds), *Spiders of North America: an identification manual.* American Arachnological Society, USA, Keene, New Hampshire, 376 pp.

TOMIĆ, V., B. DUDIĆ, L. LUČIĆ, W. BÜCHS, I. SIVČEV & T. GOTLIN-ČULJAK 2016. A case of palpal malformation in *Pardosa agrestis* (Westring, 1861). *Arachnology*, **17**:155-156.

UBICK, D., P. PAQUIN, P. E. CUSHING, & V. ROTH 2005. *Spiders of North America an identification manual*. American Arachnological Society, USA, Keene, New Hampshire, 377 pp.

YAGINUMA, T. 1966. Three anomalous spiders from Japan. *Acta Arachnologica*, **20**: 21-23.