CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA

Thirty-first meeting of the Animals Committee
On line, 31 May, 1, 4, 21 and 22 June 2021

Species specific matters

Maintenance of the Appendices

Periodic Review of species included in Appendices I and II

REPIODIC REVIEW OF *APHONOPELMA PALLIDUM*

1. This document has been submitted by Mexico.*

* *The geographical designations employed in this document do not imply the expression of any opinion whatsoever on the part of the CITES Secretariat (or the United Nations Environment Programme) concerning the legal status of any country, territory, or area, or concerning the delimitation of its frontiers or boundaries. The responsibility for the contents of the document rests exclusively with its author.*

A. Proposal

Maintain *Aphopelma pallidum* in CITES Appendix II, in accordance with Resolution Conf. 9.24 (Rev. CoP17), Annex 2b, Criterion A.

B. Proponent

Mexico*

C. Supporting statement

1. Taxonomy

1.1	Class:	Arachnida	
1.2	Order:	Araneae	
1.3	Family:	Theraphosidae	
1.4	Species:	*Aphonopelma pallidum*	
1.5	Scientific synonyms:	*Eurypelma pallidum* (Pickard-Cambridge F.O., 1987) *Brachypelma pallidum* (not valid-does not officially exist)	
1.6	Common names:	English:	Mexican gray tarantula; Mexican pink Rose; Mexican Rose tarantula, Rose-gray Tarantula
		French:	Mygale grise du Mexique; tarentule grise du Mexique
		Spanish:	Tarántula gris mexicana; tarántula rosa mexicana
1.7	Code numbers:	xxxx	

2. Overview

At the 29th meeting of the Animals Committee (2017, Geneva), Mexico volunteered to conduct the review of *Aphonopelma pallidum* as part of the Periodic Review process in accordance with Resolution Conf. 14.8 (Rev. CoP17) during the period between CoP17 and CoP19.

3. Species characteristics

3.1 Distribution

Aphonopelma pallidum is a species that is endemic to Mexico. It can be found mainly in the highlands around Chihuahua city to the Mapimi Basin region of Chihuahua State, with small populations ranging into northern Durango State (Cooper et al. 2019). In a recent review conducted by the IUCN, the species was estimated to have a potential area of occurrence of 200,072 km^2 and an area of occupancy of 88,176 km^2 (Fukushima et al. 2019; **Fig. 1**).

3.2 Habitat

According to Peña-Estrada (2021), *Aphonopelma pallidum* inhabits desert shrublands of the Chihuahuan Desert, generally in association with plants such as the shin dagger or lechuguilla (*Agave lechuguilla*), yucca shrub (*Yucca* sp.) and creosote bush (*Larrea* sp., *Asphondylia* sp.), with a higher grass ratio than other warm regions to the north and northwest of Mexico (Smith 1995). It can also be

* *The geographical designations employed in this document do not imply the expression of any opinion whatsoever on the part of the CITES Secretariat (or the United Nations Environment Programme) concerning the legal status of any country, territory, or area, or concerning the delimitation of its frontiers or boundaries. The responsibility for the contents of the document rests exclusively with its author.*

found in altered habitats such as edges of agricultural fields with limited disturbance and at the fringes of the urban environment, but the specimens observed are probably just isolated wandering individuals (Fukushima et al. 2019).

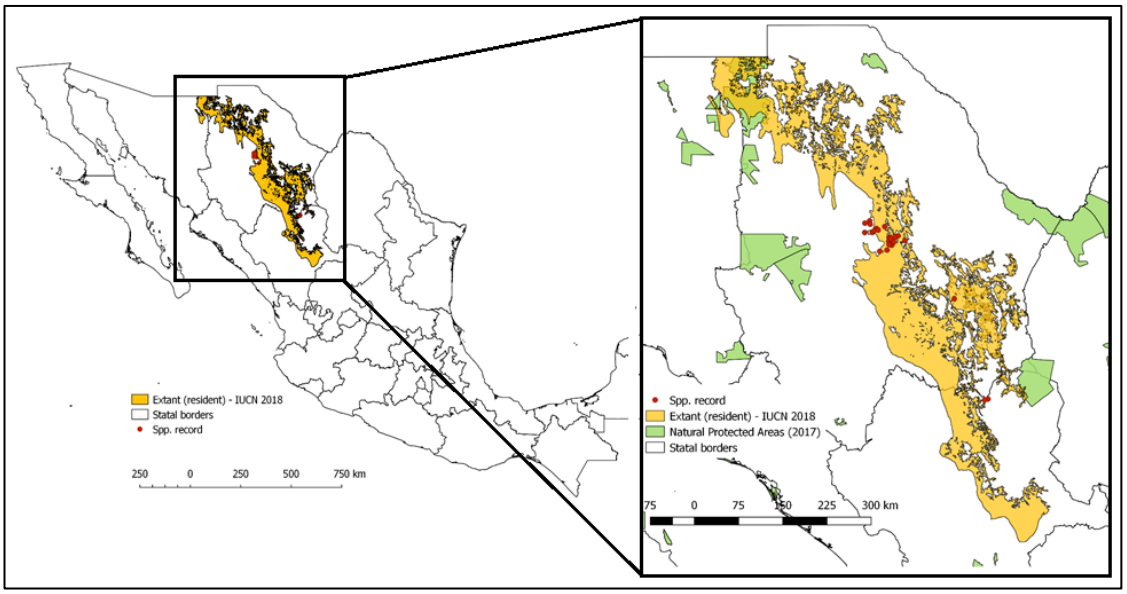

Figure 1. Potential distribution of *Aphonopelma pallidum* in Mexico; map prepared by Cardoso (2018) and presented in Fukushima et al. (2019) - IUCN. Areas in yellow show the potential area of occurrence; red dots represent records of the species according to the information provided by CONABIO (SNIB, 2021), iNaturalist (consulted in 2021) and Peña-Estrada (2021); areas in green represent Natural Protected Areas in Mexico (SEMARNAT-CONANP 2017).

3.3 Biological characteristics

Aphonopelma pallidum is a fossorial species, that is, a species that lives in burrows. It can excavate its own burrows or modify previously excavated ones between shrubs, protected from the elements and potential predators, although burrows have also been observed in open areas such as exposed slopes. The burrow entrance is usually lined with silk to deter predators such as ants or wasps and/or help keep the burrow moist (Peña-Estrada 2021).

According to Peña-Estrada (2021), these tarantulas are easier to observe in the rainy season, which coincides with the mating season: males can be seen from the end of July to the end of October and are the protagonists of the main dispersal events. The males are likely most active at night, in the cooler daylight hours and during overcast days. The species moults once a year, before the rainy season. Like other tarantulas, it is thought that females produce cocoons (i.e., large silken egg sacs) at the end of the year and the young disperse about one month or two later; however, the reproductive aspects of the species are not clearly known yet (Fukushima *et al.* 2019). Moreover, there is limited knowledge about its feeding habits, survival, mortality, home range and time of maturation, among others.

3.4 Morphological characteristics

According to Cooper *et al.* (2019), adults have an average body length of 48 mm in males and 55 mm in females; they have a brown or dark brown carapace which may exhibit metallic tones or appear “brassy”; the legs are black, covered in abundant, curly white hairs; the abdomen is covered in shorter black hairs and scattered curly white hairs (**Figure 2**); males have tibial spurs on their first pair of legs that are absent in females (**Figure 3**). In juveniles, the carapace is grey and the legs are black, covered in abundant, curly white hairs; the abdomen is covered in shorter black hairs and scattered curly hairs whose colour ranges from white to light brown (Mendoza & Francke, 2017; J. Mendoza & R. West, pers. obs.).

Figure 2. Adult specimens of *A. pallidum*. Top and bottom left: females; top and bottom right: males.

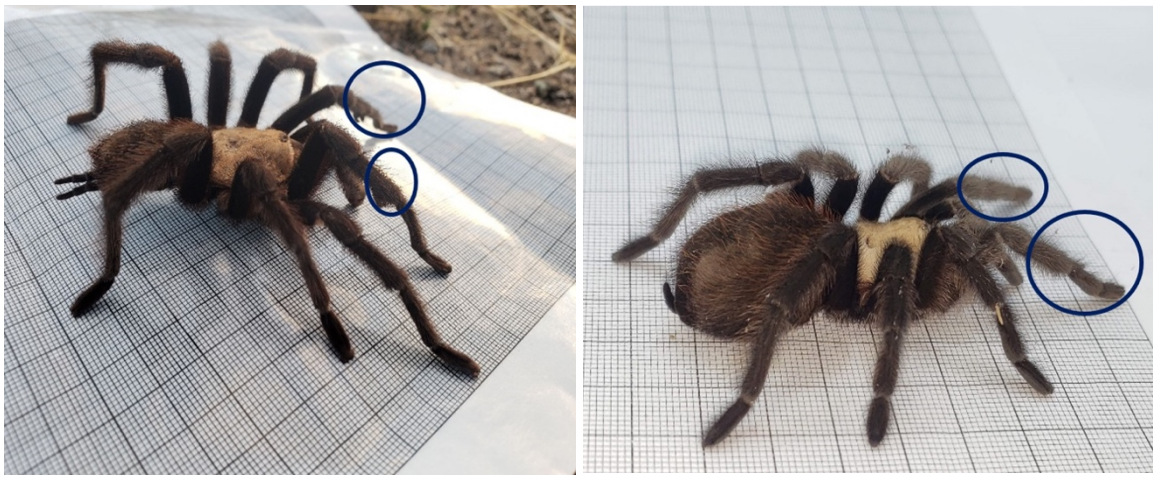

Figure 3. Morphological characters of *A. pallidum*: males have tibial spurs on leg I (left); females lack tibial spurs (right).

3.5 Role of the species in its ecosystem

Aphonopelma pallidum is a nocturnal predator that awaits its prey near its burrow entrance from dusk to dawn. It feeds mainly on insects, other spiders and some myriapods, and sometimes even small vertebrates (Fukushima et al. 2019).

This species is preyed upon by the tarantula hawk wasp (*Pepsis thisbe*), which also uses it as a host for its larvae after injecting a poison that paralyzes the tarantula; the spider is then dragged to a nest where the wasp lays its eggs; the larvae eat the inside of the tarantula until they are ready to hatch out of it (Punxo Fred. 1994). It may also be eaten by other animal species.

4. Status and trends

4.1 Habitat trends

Peña-Estrada (2021) infers that the species' habitat is declining due to changes in land use. Chihuahua city is growing and encroaching on the best-known areas of occurrence of the species; in the rest of its potential distribution (Fukushima *et al*., 2019), the habitat is being transformed into agricultural land, including pecan plantations. This trend has been observed for the last 20 years and is projected to continue until 2030, as it is part of the Mexican national agricultural development strategy (Planeación Agrícola Nacional, 2017). There are no estimates of the extent of the change; yet, according to Peña-Estrada (2021), considering the size of the potential area of distribution of the species, it can be inferred to be a moderate change and not to constitute an immediate threat.

4.2 Population size

No studies have been conducted on the species' density and/or population size. The only known effort in this regard has been made by Peña-Estrada (2021), who sampled an area around Chihuahua city. However, the results cannot be used to determine the species' density, but can be used later on to compare the change in (relative) abundance over time. Although the species' area of occupancy is relatively large, the collection of specimens by Peña-Estrada from June to October 2020 resulted in the capture of 18 specimens, some of which had been run over by vehicles on unpaved roads. This suggests that populations may not be so abundant locally.

4.3 Population structure

The population structure of the species (i.e., age/sex) is unknown. Between June and October 2020, Peña-Estrada (2021) found 18 specimens, of which two were adult females, 15 were adult males and one was a juvenile of undetermined sex. This represents a sex ratio of 9:1 (males:females) and 9:1 (adults:juveniles). A possible explanation for this structure may be that males of this species disperse while females stay close to their burrows, resulting in greater sighting rates for males.

4.4 Population trends

Based on the study conducted by Fukushima *et al.* (2019), the species is estimated to have an area of occurrence of 200,072 km^2 with a stable trend, and an area of occupancy of 88,176 km^2 with an inferred decreasing trend. Yet, considering the decline in habitat size, it is inferred that the area of occupancy is decreasing, especially around Chihuahua city.

4.5 Geographic trends

The areas where the species' presence has been recorded the most are the surroundings of Chihuahua city (Peña-Estrada 2021), which has grown and encroached on potential areas of presence of the species: in 1980, the area of the city was 84.89 km^2; in 1995, it had doubled (165.15 km^2) and in 2015 it was 251.19 km^2. This amounts to a loss of almost 40 km^2 of natural habitat every 5 years. The habitat is expected to continue to decrease, since the areas where the presence of the species has been reported have been allocated for human development by the planning authorities of Chihuahua city (IMPLAN, 2020). Trends and historical losses of primary habitats are unknown in pecan growing and other agricultural areas.

5. Threats

As described in sections 4.1 and 4.5, the greatest threat to *Aphonopelma pallidum* in the long term is land use change, especially due to urban encroachment on the main area of occurrence of the species, as well as agricultural activities in the rest of its potential distribution. However, the species is also affected by activities associated with the presence of humans such as recreational ones: it is common to find specimens run over by vehicles on dirt tracks or killed on walls or in yards. In general, residents of the area around the city kill the specimens when they see them. Vehicles and machinery also inadvertently kill individuals while preparing land for construction (Fukushima *et al.,* 2019; Peña-Estrada 2021). At present, the trade or harvest of the species does not pose a direct threat to its wild populations.

6. Utilization and trade

6.1 National utilization

In Mexico, the harvest and use of wild species are regulated through the General Wildlife Act (Ley General de Vida Silvestre, LGVS, 2000). This legislation establishes that it is only possible to use native wild species through registered Wildlife Management and Conservation Units known as UMAs (Unidades de Manejo para la Conservación de la Vida Silvestre) or premises and facilities that manage wildlife (Predios e Instalaciones que Manejan Vida Silvestre, PIMVS), either with an extensive (i.e., *in situ*) scheme based on wild harvests or an intensive (i.e., *ex situ*) scheme, as closed-cycle breeding operations. The UMAs must have a management plan that has been approved by the Mexican Wildlife Agency (Dirección General de Vida Silvestre, DGVS-SEMARNAT), which is also the CITES Management Authority of Mexico, or its offices in decentralized States. The management plan must clearly state its objectives (e.g., conservation, education, extractive or non-extractive commercial use). Any extractive use of wildlife must be supported by reports proving that the replacement rate is higher than the harvest rate, and also include the necessary measures to guarantee sustainable use.

According to Peña-Estrada (2021), there is little interest in harvesting specimens of *Aphonopelma pallidum* for legal sale and use in the pet trade. However, given the similarity of the species with *Brachypelma albiceps* and *Aphonopelma hentzi,* it may be confused and traded – legally or illegally – under those names. There is no information available on the importance of the species for private national or international collections. Based on information provided by DGVS-SEMARNAT, only two UMAs are registered to use the species in Mexico; they are operations for intensive management of the species (i.e., in captivity). These UMAs are located in States of central Mexico and have an approved management plan to conduct conservation, exhibition, research and commercial use activities. However, they have not reported any current activities and have not applied for any authorizations for the use of *A. pallidum* for commercial purposes.

6.2 Legal trade

National: based on the information provided by DGVS-SEMARNAT, no authorizations for the use of *A. pallidum* were issued between 2000 and 2018, so it is inferred that neither of the two UMAs that are registered for the species trade in it.

International: according to the UNEP-WCMC/CITES database (consulted in 2020), there were no records of exports of the species from Mexico between 2000 and 2019. The database only includes one record in 2001 of 117 live individuals exported from Germany to the United States; the specimens were captive bred (code C) and exported for commercial purposes (code T). A search encompassing a longer period in the database (1994-2000) showed 7 additional records of a total of 1,020 specimens: Mexico was the country of origin in only one record (1996): two specimens with source code “O” (pre-Convention); there was one record in 1994 of 900 live captive-bred specimens (code “C”) exported from France to the United States. Considering that the species is endemic to Mexico, the specimens from which the parental stock in other countries is derived: a) may have been exported and not recorded in the database; b) may have been misidentified and recorded as individuals of another species (such as *Brachypelma albiceps* or *Aphonopelma hentzi*); or c), may have been smuggled out of Mexico to establish a private collector’s captive population.

Regarding the possibility of being traded under the name of other species, we consulted the UNEP-WCMC/CITES database for *Brachypelma albiceps*. In 2005-2019, the database recorded the export of 1,158 specimens of *B. albiceps* from Mexico (of a total of 1,830 specimens), all recorded as captive bred (C), most of them for commercial purposes (T); the final destination was the United States for at least 850 of these specimens. This suggests that *B. albiceps* is relatively common in trade and that specimens of *Aphonopelma pallidum* may have been traded under that name due to the great resemblance between both. Moreover, *A. hentzi* (not listed in CITES) is also quite similar to *A. pallidum* and *B. albiceps* and is popular in trade, with a price per individual ranging from USD $40 to $80. Considering that these species can only be distinguished using a microscope, there may be misidentified records (Peña-Estrada, 2021).

6.3 Parts and derivatives in trade

Illegal trade records in the UNEP-WCMC/CITES database and seizures made by the Mexican environmental law enforcement agency (PROFEPA) suggest that trade is usually in live specimens of the species; there are no records of parts or derivatives in trade. There is no information available on the age and/or sex of the individuals traded.

6.4 Illegal trade

National: According to the Mexican environmental law enforcement agency (PROFEPA, Procuraduría Federal de Protección al Ambiente), 15 specimens of *Aphonopelma pallidum* were seized in six different events from 2013 to 2018. Four seizures took place in zoos, one was in a retail shop and one concerned a serpentarium. None of these establishments had the necessary permits.

Due to the similarity of *A. pallidum* with *Aphopelma hentzi* and *Brachypelma albiceps*, illegal trade in *A. pallidum* may be under-recorded (Peña-Estrada, 2021). The resemblance with these species, particularly in juvenile specimens, may be a reason why *A. pallidum* is not reported in trade. Typically, poachers cannot distinguish between these species and may collect specimens of *A. pallidum* and sell them as *B. albiceps* or *A. hentzi*, which are more common in trade (Fukushima *et al*. 2019). Peña-Estrada (2021) conducted an Internet survey for about 30 days and did not find any specimens of *A. pallidum* offered for sale; however, some markets (including open-air markets in Chihuahua) ceased their activity due to the COVID-SARS-19 pandemic. The species has been seen in those markets in the past.

International: In the 2000-2019 period, the UNEP-WCMC/CITES database only included one record of illegal trade of the species from the United States. According to the consultations made by Peña-Estrada (2021) to tarantula experts (Carol Fukushima, Danniella Sherwood), there are no specific data on illegal trade of the species in 2020. However, the experts highlighted the similarity between *A. pallidum* and *A. hentzi* and *B. albiceps* and the possibility that it may be traded under the name of those species. Therefore, it is not possible to rule out that *A. pallidum* has been collected and traded as *B. albiceps* or *A. hentzi.*

Based on the Sustainable Trade in Tarantulas: Action Plan for North America (CCA, 2017), specimens of *A. pallidum* may be harvested by poachers who sell them as *B. albiceps* because of their market value; young captive-bred specimens are sold for around USD $20-60 in Canada and the United States, USD $4 in Mexico and USD $9 in the European Union. The average price of an adult male specimen of *B. albiceps* is about USD $50 in Canada, while that of females reaches close to USD $250 in the United States and USD $47 in the European Union (CCA, 2017).

6.5 Actual or potential trade impacts

Legal or illegal (recorded) trade for the species is particularly low. *A. pallidum* is mainly attractive for the pet trade, which does not seem to pose an immediate threat to the species. There does not seem to be a significant harvest from the wild either; however, it is important to reiterate that the extent or frequency with which this species may be traded as *Aphonopelma hentzi* or *Brachypelma albiceps* is unknown.

7. Legal instruments

7.1 National

The main legal instruments to regulate the use and conservation of wild species in Mexico as well as their habitats and ecosystems are the General Ecological Balance and Environmental Protection Act (Ley General de Equilibrio Ecológico y Protección al Ambiente, LGEEPA; DOF, 1988) and the General Wildlife Act (Ley General de Vida Silvestre, LGVS; DOF 2000) and their respective regulations (DOF-LGEEPA, 2014; DOF-LGVS, 2014).

The General Wildlife Act establishes the criteria regarding the types of use and harvest that are permitted. In Mexico, it is only possible to harvest wild species legally through a UMA (see **section 6.1**) with a management plan listing specific actions for the species of interest that has been approved by the authorities. The surveillance of legal/illegal trade is entrusted to PROFEPA (Procuraduría Federal de Protección al Ambiente), the environmental law enforcement agency, which is also the CITES Enforcement Authority in Mexico.

7.2 International

The species has been listed in CITES Appendix II since 1995, when it was decided to include the entire genus *Brachypelma* (which was then considered to include the species) without any specific assessment of the species. Taxonomic changes have resulted in the species currently belonging to the genus *Aphonopelma* but still being included in CITES Appendix II. After the review by Peña-Estrada (2021), it is suggested that *Aphonopelma pallidum* should remain in Appendix II given its similarity with other species, especially *B. albiceps*.

8. Species management

8.1 Management measures

The species was included in the Sustainable Trade in Tarantulas: Action Plan for North America (CCA 2017) along with 15 other species of interest. The action plan proposes actions to strengthen cooperation between sectors interested in participating in a sustainable trade chain of these species at a subcontinental level. The action plan was rediscussed in the Tarantula Trinational Trade and Enforcement Workshop (CCA 2019, Mexico-USA-Canada), during which assessments were made of the conservation status of the 16 tarantula species to update the IUCN Red List and an identification guide was developed to strengthen CITES implementation (Cooper *et al.*, 2019).

8.2 Population monitoring

Among the few population monitoring efforts that have been made, Peña-Estrada (2021) has conducted independent monitoring and conservation actions in the surroundings of Chihuahua city.

The species was considered in the Sustainable Trade in Tarantulas: Action Plan for North America (CCA 2017), through which its taxonomy and biological and trade data were reviewed. In addition, potential threats and opportunities for its sustainable trade were identified. As a result of this action plan, the workshop held in 2019 (see section 8.1) led to an update of its conservation status to Least Concern (LC) in the IUCN Red List (Fukushima et al., 2019).

8.3 Control measures

National: Given that the species is not present in any UMAs registered for the management of wildlife *in situ* (i.e., in the wild), it is not the subject of any specific management plans. There does not seem to be a particular management of the species either in the Natural Protected Areas where it may potentially occur. There is no specific information available on its reproduction or captive breeding in Mexico or other countries (Peña-Estrada, 2021). However, there are management data and UMA records of species that are similar to *Aphonopelma pallidum*. In fact, according to the trade records of the UNEP-WCMC/CITES database (consulted in 2020), there seems to be management (e.g., breeding, exchange, sale) of those species in other countries. For example, *B. albiceps* has been exported from Germany, the Czech Republic, Austria and the Netherlands, among other countries recorded as countries of origin. It is assumed that there are individuals housed in collections in these countries (Peña-Estrada, 2021).

In the past, there used to be some confusion about the inclusion of this species in the Mexican list of threatened species (NOM-059-SEMARNAT-2010, DOF 2010): there was a species classified as Threatened under the name of *Brachypelma pallidum*, as a(n incorrect) synonym of *A. pallidum*. The name *B. pallidum* originated from European collectors and the species could even be traded under the name of *B. verdezi* (currently defined as *Tlilcoatl verdezi*). Some specimens of so-called *B. pallidum* were actually specimens of *B. albiceps* (based on the region from which the specimens were sourced, in central Mexico). Currently, *B. pallidum* is not recognized as a species, while *A. pallidum* is recognized as such (Smith, A. M., 1995; Peters, H.-J. 2003; Cooper, et al., 2019; Fukushima et al., 2019; Sherwood, 2019) and is not included in the Mexican list of threatened species. However, based on the assessments made by Peña-Estrada (2021), its inclusion in the list may be warranted, particularly considering the influence of human activities on the habitat of the species.

International: Given that the species is listed in CITES Appendix II, its legal international trade is regulated and requires CITES permits and certificates.

The identification guide (Cooper *et al.,* 2019) derived from the CCA Action Plan (CCA 2017; CCA 2019) contributes to strengthening law enforcement and facilitating the task of enforcement authorities by providing inspectors with the necessary information to identify specimens of CITES-listed tarantulas (in English, French and Spanish).

8.4 Captive breeding and artificial propagation

Although there are only two registered UMAs for the management of the species in captivity (i.e., *ex situ*) for the purposes of conservation, research and use, at least one of them applied for the register because it keeps two specimens, possibly received as part of a seizure. No activities have been reported by either UMA since 2016 and 2017, so they may be inactive.

In general, there is no information on the appropriate parameters for breeding or keeping the species in captivity. This type of data on *B. albiceps, B. verdezi* and *A. hentzi* – if it exists – could be used as a basis for keeping *A. pallidum* (Peña-Estrada, 2021).

8.5 Habitat conservation

Aphonopelma pallidum has been observed in Cumbres de Majalca National Park, in Chihuahua State (Peña-Estrada 2021). Peña-Estrada (2021) reports that there have been outreach activities implemented for 5 years in which local residents are informed about the importance of tarantulas in order to dissuade them from killing them intentionally. This protected area only includes 0.05% of the potential distribution of the species modelled by Cardoso (2018, in Fukushima et al., 2019). Peña-Estrada (2021) reports that the species has also been recorded in Presa del Rejón State Park in Chihuahua, where posters have been placed to inform visitors and raise awareness to prevent the killing of tarantulas. Park staff have identified an area with suitable habitat for the protection of the tarantula, where up to 0.10% of the potential distribution of the species may be conserved. Individuals have also been reported in Chuvíscar archaeological site in Chihuahua, protected by Mexico's National Institute of Anthropology and History (INAH, Instituto Nacional de Antropología e Historia). Although the local people do not like the presence of tarantulas, they do not seem intent to kill them; this area may be protecting 0.10% of the species' potential distribution.

Based on the potential distribution of the species produced by Cardoso (2018; in Fukushima et al., 2019) and as shown on **Figure 1**, Janos Biosphere Reserve, which lies between Chihuahua and Sonora States, in the north of the species' potential distribution, has adequate conditions for its presence. However, the species has not been recorded in that area.

8.6 Safeguards

Does not apply.

9. Information on similar species

a) *Aphonopelma pallidum* is very similar to *Brachypelma albiceps*, mainly in size and colour, both in adult and juvenile individuals. Yet, both species do not naturally occur in the same areas. It is possible to distinguish between both species based on some characters: the genus can be distinguished by looking at the carapace: in *Aphonopelma*, seen from above, it is oval (i.e., longer than wide) and, seen from the side, it has a higher cephalic (head) region (**Fig. 4**); in *Brachypelma* sp., the carapaces of males and females are round (**Fig. 4**). According to the tarantula identification guide by Cooper *et al*. (2019), species of *Aphonopelma* can also be distinguished from those of *Brachypelma* and *Sericopelma* by the urticating hairs on the abdomen (only visible with a microscope or electron micrographs): *Aphonopelma* has type I urticating hairs, while *Brachypelma* and *Sericopelma* have a combination of type I and type III urticating hairs (**Fig. 5**). Therefore, these species are not easy to distinguish with the naked eye and may cause identification problems for inspectors (Peña-Estrada, 2021).

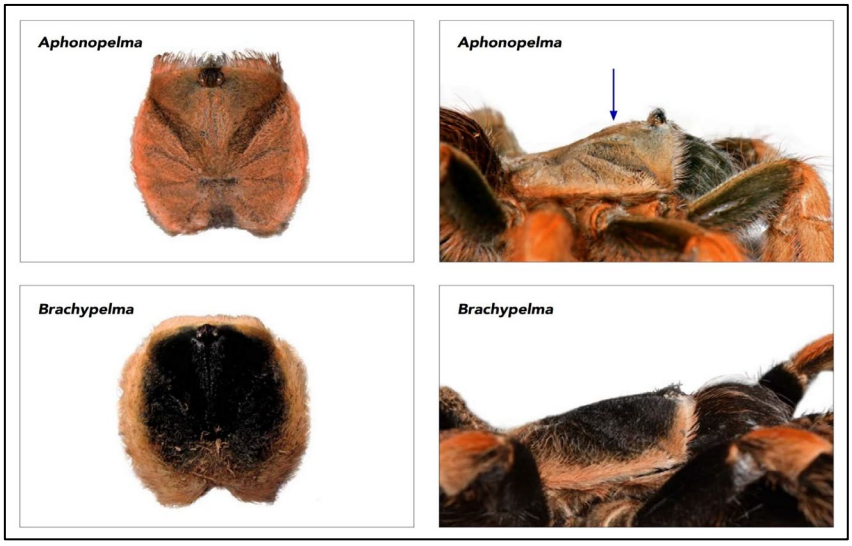

Figure 4. Differences in the carapaces of *Aphonopelma* and *Brachypelma* tarantulas (illustration taken and modified from the tarantula identification guide - Cooper et al., 2019).

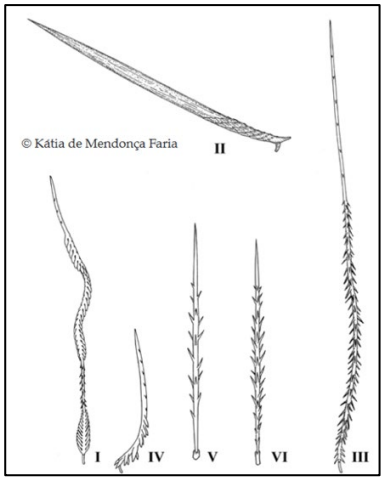

Figure 5. Types of urticating hairs in the abdomen of tarantulas. Drawing taken from the tarantula identification guide (Cooper et al., 2019).

b) *A. pallidum* also has similarities with *Aphonopelma hentzi*: It is only possible to differentiate between both species using a microscope and looking at the distance between their eyes and their size (Peña-Estrada 2021).

According to Peña-Estrada (2021), the taxonomy of Mexican species of *Aphonopelma* is still unstable and problematic and, in many cases, it has not been reviewed reliably since the species were first described. Many of the descriptions are short and based on individual specimens, without taking into account intraspecific morphological variation (Sherwood, 2019).

10. Consultations

The species is endemic to Mexico so no additional countries were consulted.

11. Additional remarks

Does not apply.

12. References

Comisión para la Cooperación Ambiental (CCA). 2017. Plan de acción de América del Norte para un comercio sustentable de especies de tarántula, Comisión para la Cooperación Ambiental, Montreal, 48 pp.

Comisión para la Cooperación Ambiental (CCA). 2019. Colaboración para fomentar un comercio sustentable de especies de tarántulas de América del Norte: hallazgos del Taller trinacional sobre comercio de tarántulas y aplicación de la legislación pertinente. Montreal, Canadá: Comisión para la Cooperación Ambiental. 31 pp.

Cooper, E.W.T., West, R. y Mendoza, J. (2019), Identificación de Tarántulas Listadas en la CITES: especies *Aphonopelma, Brachypelma* y *Sericopelma*, Comisión para la Cooperación Ambiental, Montreal, 80 pp.

Diario Oficial de la Federación (DOF 1988). Ley General de Equilibrio Ecológico y Protección al Ambiente. 1988. Cámara de Diputados del H. Congreso de la Unión. Ultima reforma. 05/06/2018.

Diario Oficial de la Federación (DOF 2000). Ley General de Vida Silvestre. LGVS. Cámara de Diputados del H. Congreso de la Unión. Ultima reforma DOF. 19/01/018.

Diario Oficial de la Federación (DOF 2010). Secretaría del Medio Ambiente y Recursos Naturales. NOM-059-SEMARNAT-2010 - Protección ambiental - Especies nativas de México de flora y fauna silvestres - Categorías de riesgo y especificaciones para su inclusión, exclusión o cambio. Lista de especies en riesgo. Diario Oficial de la Federación, 30 de diciembre de 2010.

Enciclovida (*Aphonopelma pallidum*, 2021): https://enciclovida.mx/especies/92173-aphonopelma-pallidum (Observaciones del Sistema Nacional de Información sobre Biodiversidad - SNIB; Observaciones de Naturalista - Ciencia ciudadana, 2021).

IMPLAN (Instituto de planeación integral del municipio de Chihuahua). 2020. https://implanchihuahua.org/

iNaturalist (2018), "Tarantulas (Family Theraphosidae)", California Academy of Sciences, San Francisco, en: <www.inaturalist.org/taxa/47424-Theraphosidae>.

Fukushima et al. 2019. Species conservation profiles of tarantula spiders (Araneae, Theraphosidae) listed on CITES November 2019. Biodiversity Data Journal 7:39342 DOI: 10.3897/BDJ.7. e39342

Fukushima, C., Mendoza, J., West, R., Longhorn, S., Rivera Téllez, E., Cooper, E.W.T., Henriques, S. & Cardoso, P. 2019. *Aphonopelma pallidum* (amended version of 2019 assessment). The IUCN Red List of Threatened Species 2019.

Geoportal (CONABIO):

Mendoza, J. I. & Francke, O. F. (2017). Systematic revision of *Brachypelma* red-kneed tarantulas (Araneae: Theraphosidae), and the use of DNA barcodes to assist in the identification and conservation of CITES-listed species

Naturalista, 2020. Observaciones de *Aphonopelma pallidum,* Chihuahua Chihuahua. https://www.naturalista.mx/observations?place_id=6793&project_id=3383&taxon_id=264081

Planeación agrícola Nacional. Nuez Pecanera. SAGARPA. 2017. https://www.gob.mx/cms/uploads/attachment/file/257079/Potencial-Nuez_Pecanera.pdf

Peters, H.-J. (2003). Tarantulas of the world: Amerika's Vogelspinnen. Published by the author, Wegberg, Germany, 328 pp.

Pickard-Cambridge, F. O. (1897a). Arachnida - Araneida and Opiliones. In: Biologia Centrali-Americana, Zoology. London 2, 1-40, pl. 1-3.

Punxo Fred (1994) The Biology of the Spider Wasp Pepsis Thisbe (Hymenoptera: Pompilidae) From Trans Pecos, Texas. I. Adult Morphometrics, Larval Development and the Ontogeny of Larval Feeding Patterns

SEMARNAT-CONANP, (01/11/2017). '182ANP_Geo_ITRF08_Noviembre_2017', edición: 2017. Secretaría de Medio Ambiente y Recursos Naturales, Comisión Nacional de Áreas Naturales Protegidas. Ciudad de México, México. (http://www.conabio.gob.mx/informacion/metadata/gis/anpnov17gw.xml?_httpcache=yes&_xsl=/db/metadata/xsl/fgdc_html.xsl&_indent=no)

Sherwood, D. (2019). *Aphonopelma braunshausenii* Tesmoingt, 1996 is a nomen dubium, with review of some historic morphological characters ineffective at species delineation (Araneae: Theraphosidae). Zootaxa 4657(3): 573-580. doi:10.11646/zootaxa.4657.3.9

Smith, A. M. (1986). The tarantula: classification and identification guide. Fitzgerald Publishing, London, 179 pp.

Smith, A. M. (1993). A new mygalomorph spider from Mexico (*Brachypelma*, Theraphosidae, Arachnida) *Brachypelma baumgarteni* Nsp. British Tarantula Society Journal 8(4): 14-19.

Smith, A. M. (1995). Tarantula Spiders: Tarantulas of the U.S.A. and Mexico. Fitzgerald Publishing, London, 196 pp.

SNIB-CONABIO, 2021. Sistema Nacional de Información sobre la Biodiversidad de México. http://www.snib.mx/

Publications consulted only as a reference but not cited

Aphonopelma pallidum. World Spider Catalog. Retrieved 8 July 2017.

Coddington, J., Young L. y Coyle F. 1996 Estimating spider species richness in a southern Appalachian cove hardwood forest. Journal of Aranchnology, 24: 11-124.

Platnick, N. (2006). Taxonomic Checklist of CITES listed Spider Species. Information extracted from The World Spider Catalog, an online reference, Version 6.5 as of 7 April 2006

ACKNOWLEDGMENTS

We would like to thank the author of the review of this species, Alejandra Peña Estrada, MSc, for the fieldwork and documentation, in which she included personal unpublished scientific data as well as information from the tarantula experts Ernie Cooper, Rick West, Daniella Sherwood, Jorge Mendoza and Carol Fukushima.