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Research Article/Araştırma Makalesi

Contributions to the spider (Araneae) fauna of Türkiye

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Abstract: This paper presents the results of a preliminary survey of the spiders of Marmara region and provides new data on the spider fauna of Türkiye. During the study, spider samples were collected by hand aspirator and pitfall traps. As a result, *Heliophanus apiatus* Simon, 1868 (Salticidae) is recorded for the first time from Türkiye. Also, occurrence of *Amaurobius pallidus* L. Koch, 1868 (Amaurobiidae) is confirmed with this study. Additionally, the record of *H. apiatus* from Marmara region represents the easternmost point of its distribution range. A morphological diagnosis, comparative pictures, and illustrations are provided for both species.

Keywords: Araneofauna, distribution, Amaurobiidae, Salticidae, Marmara Region.

Türkiye Örümcek (Araneae) Faunasına Katkılar

Öz: Bu makale, Marmara bölgesi örümcekleri üzerinde yapılan ön araştırmanın sonuçlarını ve Türkiye örümcek faunasına ilişkin yeni verileri sunmaktadır. Çalışma sırasında örümcek örnekleri el aspiratörü ve düşürme tuzakları ile toplandı. *Heliophanus apiatus* Simon, 1868 (Salticidae) Türkiye'den ilk kez kayıt altına alındı. Ayrıca *Amaurobius pallidus* L. Koch, 1868 (Amaurobiidae)'nin varlığı bu çalışmayla doğrulandı. Ayrıca *H. apiatus*'un Marmara bölgesinden kaydedilmesi dağılım aralığının en doğu noktasını temsil etmektedir. Her iki tür için morfolojik tanı, karşılaştırmalı fotoğraflar ve çizimler sunulmuştur.

Anahtar kelimeler: Araneofauna, yayılış, Amaurobiidae, Salticidae, Marmara Bölgesi.

1. Introduction

The spider fauna of Türkiye is currently represented by 57 families, 371 genera, and 1277 species (Danışman et al., 2023; World Spider Catalog, 2023). This number is gradually increasing with data obtained from recent studies. Salticidae Blackwall, 1841 is the largest family of spiders, with 677 genera and 6633 species. Currently, this family is represented by 151 species in 41 genera in Türkiye. Among these genera, *Heliophanus* C. L. Koch, 1833 includes 20 species in Türkiye of which two are endemic. Amaurobiidae Thorell, 1869 is taxonomically challenging family with 50 genera and 289 species globally. In Türkiye, this family is represented by six species in two genera. These are *Amaurobius* C. L. Koch, 1837 and *Callobius* Chamberlin, 1947. *Amaurobius* is represented by five species in Türkiye (Danışman et al., 2023; World Spider Catalog, 2023).

The aim of the current paper is to add *Heliophanus apiatus* as a new record and to confirm the occurrence of *Amaurobius pallidus* for the spider fauna of Türkiye.

2. Material and Methods

The samples examined in this study were collected from İstanbul, Bursa, and Kocaeli provinces in Marmara region of Türkiye (Fig. 1).

Spiders were collected using a hand aspirator and pitfall traps between 2018 and 2019. They are preserved in 70% ethanol and deposited in the Zoological Museum of the Bursa Uludağ University, Türkiye (ZMUU, R.S. Kaya).

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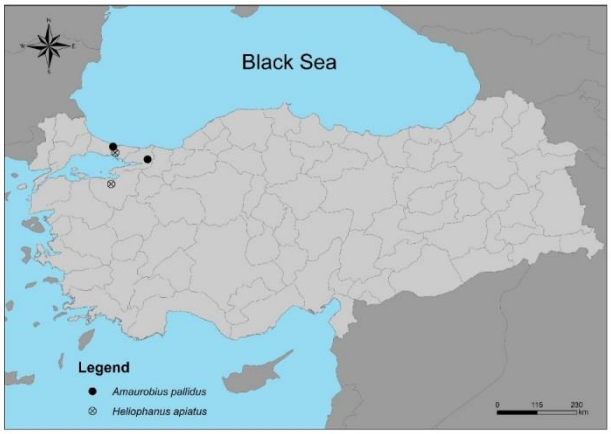


Figure 1. The localities where specimens were collected from the Marmara Region of Türkiye.

The identification was made by using the descriptions of Wiehle (1953), Wesołowska (1986), Thaler & Knoflach (1993), and Komnenov et al. (2016).

The digital images were taken with a Leica DFC295 digital camera attached to a Leica S8APO stereo microscope. Measurements were taken from the dorsal side of the body and all measurements are in millimeters.

The nomenclature follows World Spider Catalog (2023) and the terminology of male palp follows Wesołowska (1986), Thaler & Knoflach (1993), Marusik et al. (2012), and Ballarin & Pantini (2017).

3. Results

Family Amaurobiidae Thorell, 1870

Genus *Amaurobius* C. L. Koch, 1837

Species *Amaurobius pallidus* L. Koch, 1868

For a complete list of synonyms, see the World Spider Catalog (2023).

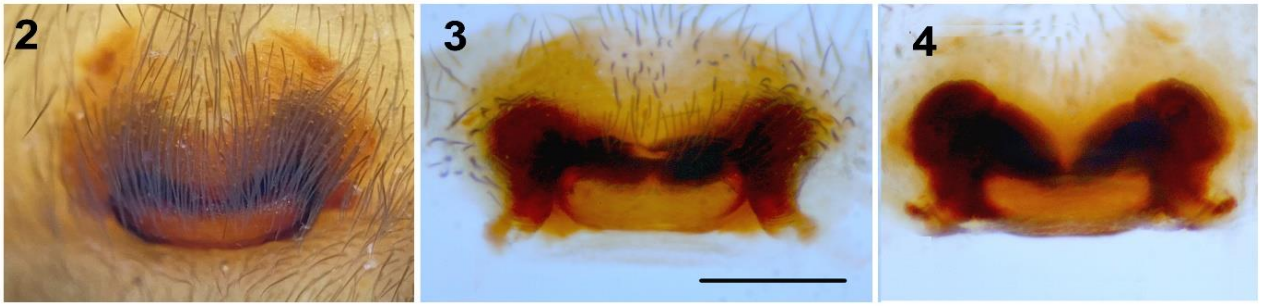
Material Examined. Türkiye, 4♂♂, 13♀♀, İstanbul Province, 11.03.2018, 41°11'49.00"N 28°57'36.00"E, pitfall traps, leg. G. Gündüz; 6♂♂, Kocaeli Province, 22.04.2018, 40°50'19.00"N 30° 8'14.00"E, hand collecting, leg. G. Gündüz.

Diagnosis. It can be distinguished from the other species within the genus by the pointed and inclined lateral extension of the dorsal apophysis and the rounded structure of the distal part of the retrolateral branch of the tibial apophysis. Although the shape and position of the spermathecae are quite similar to *Amaurobius strandi* Charitonov, 1937, it can be differentiated from this species by the curved posterior margin of the median plate.

Description. (Figs. 2–8)

Female. Total length 9.40. Carapace 4.06 long and 2.65 wide. Abdomen 5.34 long. Carapace brown, cephalic region darker. Fovea and radial lines prominent. Anterior eye row straight, posterior eye row slightly procurved. Posterior row of eyes wider than anterior row of eyes. Chelicerae dark brown and anterior surface with short dark hairs. Sternum yellowish brown. Gnathocoxa, roughly oblong with light-colored rims facing mouth. Legs brown, and darker in tibiae, metatarsi and tarsi. Abdomen light brown, with grayish patches dorsally.

Epigyne. Epigyne wider than long, median plate rectangular; spermathecae tapering towards the center (Figs. 2–4).



Figures 2-4. Female *Amaurobius pallidus* L. Koch, 1868. 2. Epigyne, ventral view. 3. Intact epigyne, ventral view. 4. Vulvae, dorsal view (Scale lines: 0.5).

Male. Total length 7.21. Carapace 3.73 long, 2.57 wide. Abdomen 3.48 long.

General features as in females except for slightly lighter coloration.

Palp. Tibia short, retrolateral tibial apophysis long, ending with a rounded tip, prolateral-dorsal tibial apophysis slightly curved retrolaterally and ending with a pointed tip, intermediate apophysis oval-shaped in dorsal view. Tegular apophysis triangular and located close to the base of triangular median apophysis, embolus hook-like (Figs. 5–8).

Habitat. The specimens were collected from the forest litter and under the bark in mixed forests.

Distribution. Southeastern Europe to Georgia, new to Türkiye (World Spider Catalog, 2023).

Notes. *Amaurobius* is the most species-rich genus in Amaurobiidae, comprising 67 species mainly distributed in North America and Europe (World Spider Catalog, 2023). The genus is characterized by presence of a cribellum; anterior median eyes closer to each other than to lateral eyes; median band on abdomen absent or visible only in the anterior part; epigyne with weakly sclerotized median plate not clearly separated into two parts; male palpal tibia with distinct dorsal apophysis, dorsal tibial apophysis usually massive and short, always not elongated and not overlying cymbium (Ballarin & Pantini, 2017). To date, five *Amaurobius* species have been reported from Türkiye (Danışman et al. 2023). Recently, *A. strandi* was recorded from Kastamonu Province by Türkeş et al. (2023). Detailed figures of *A. pallidus* were given by Komnenov et al. (2016) based on specimens from Greece and by Thaler and Knoflach (1993) based on specimens from Bulgaria. *Amaurobius pallidus* differs from the other congeners by the palpal structures (long and round retrolateral tibial apophysis, slightly curved and bifurcate prolateral-dorsal tibial apophysis and the intermediate apophysis) and epigynal structures. Although *A. pallidus* is listed in the Checklist of Turkish Spiders by Danışman et. al (2023), there is no study in the literature confirming the species' occurence in Türkiye. Therefore, with this study, the presence of the species in Türkiye has been confirmed.

Family Salticidae Blackwall, 1841

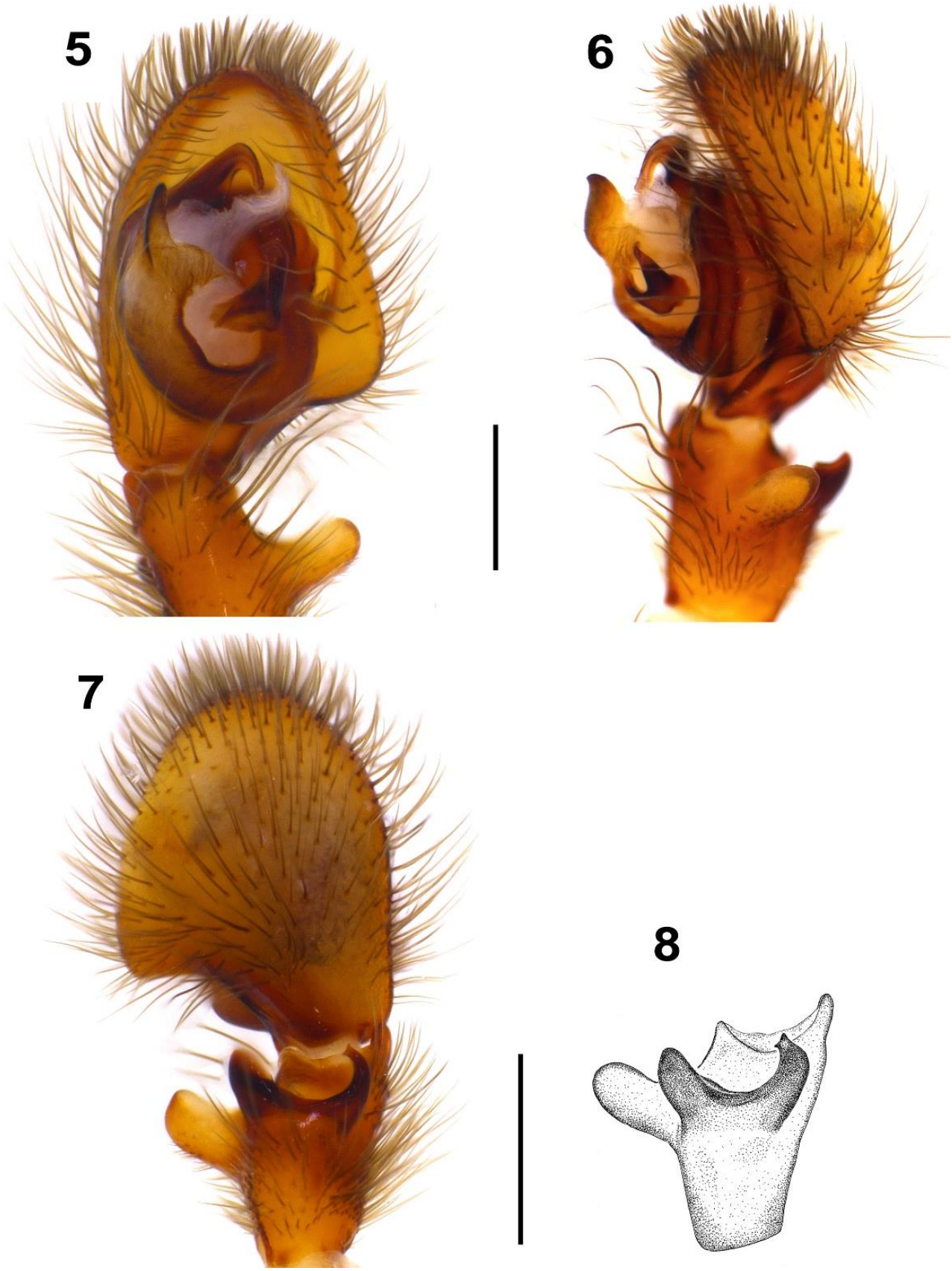
Genus *Heliophanus* C. L. Koch, 1833

Species *Heliophanus apiatus* Simon, 1868

For a complete list of synonyms, see the World Spider Catalog (2023).

Material Examined. Türkiye, 1♂, Bursa Province, 08.08.2018, 40°13'28.00"K 28°51'59.00"D, hand collection, leg. R. Kaya; 2♂♂, İstanbul Province, 18.05.2019, 41° 02'15.00"N 29° 01'55.00"E, hand collection, leg. G. Gündüz.

Diagnosis. As stated by Wesolowska (1986), *H. apiatus* is most similar to *Heliophanus encifer* Simon, 1871 and *Heliophanus creticus* Giltay, 1932. It can be distinguished from both species, especially by the orientation of the embolus and the structure of the femoral apophysis.



Figures 5-8. *Amaurobius pallidus* L. Koch, 1868. 5. Male palp, ventral view. 6. Male palp, retrolateral view. 7. Male palp, dorsal view. 8. Male palp, patella dorsal view (Scale lines: 0.5).

Description. (Figs. 9–13)

Male. Total length 3.62. Carapace 1.76 long, 1.5 width. Abdomen 1.89 long. Carapace dark brown and cephalic part slightly elevated. Posterior median eyes with small areas of white hairs at its posterior. Thin white stripes on lateral side of chelicerae and at borders of carapace. Chelicerae and sternum dark brown. Legs brown, lighter areas at junctions of coxae, trochanters, metatarsi and tarsi.

Abdomen dark brown with white band on anterior margin and sparse yellowish setae. Dorsal side of abdomen with two pairs of white spots at center, rear spots the smallest. Abdomen has a very characteristic narrow white band in its anterior margin (Fig. 9).

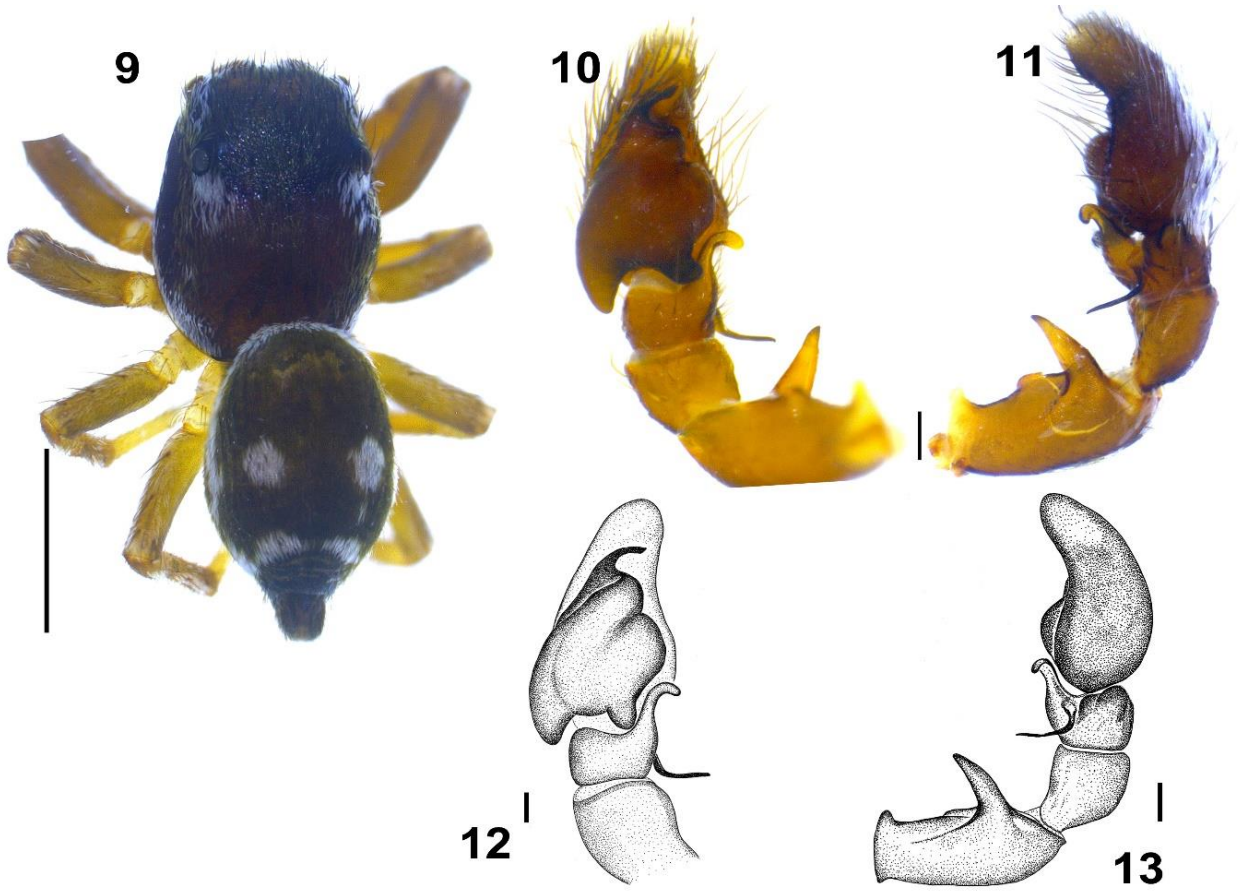
Palp. Palp uniformly dark; femur robust and with a large, sloping and pointed apophysis. Horizontal tibial apophysis, long, slender and strongly sclerotized. Bulb with two distinct lob-shaped apophyses, embolus short and thick. (Figs. 10–13).

Habitat. The specimens were collected from walls of buildings and over fences.

Distribution: Portugal to Italy, introduced to USA, new to Türkiye (World Spider Catalog, 2023).

Notes. *Heliophanus* can be distinguished from the other genera of Salticidae by the remarkable appearance of the habitus, abdomen uniformly black and shining metallic, dorsally sometimes with small white dots in pairs, the anterior margin sometimes with a half-moon-like white line; legs often yellow (Wesołowska, 1986). A total of 170 *Heliophanus* species have been recorded worldwide, including 103 species from the Palaearctic region (World Spider Catalog, 2023). Only *H. feltoni* Logunov, 2009 and *H. konradthaleri* Logunov, 2009 are endemic to Türkiye. *Heliophanus apiatus* belongs to the *apiatus* group (Wesołowska, 1986) but differs from the congeners in having a strongly pointed femoral process in males.

The specimens reported in this study represent the easternmost record of the known zoogeographical range of *H. apiatus*. Two recent papers mentioned the possibility of the species being synanthropic (Rozwalka et al., 2013; Cutler et al., 2021). However, there is no evidence that *H. apiatus* specifically prefers antropogenic habitats. At the same time, considering the wide distribution of this species within the Mediterranean basin, it is not surprising that it is found in Türkiye and especially in the Marmara region where a Mediterranean climate is dominant.



Figures 9-13. *Heliophanus apiatus* Simon, 1868. 9. Male habitus, dorsal view (Scale lines: 1.2). 10-12. Male palp, ventral view. 11-13. Male palp, retrolateral view (Scale lines: 0.1).

4. Discussion

In this study, *H. apiatus* (Salticidae) is reported for the first time and the ocurrence of *A. pallidus* (Amaurobiidae) is verified from Türkiye. Among them, *A. pallidus* has been frequently encountered in the field studies conducted in the region. Particularly, it seems to have a widespread and large population in the litter of mixed forests on the northern slopes of the hills located to the south of Marmara Sea.

The record of *H. apiatus* represents the easternmost distribution record for this species. Some publications in recent years have emphasized that the species may be synanthropic (Rozwalka et al., 2013; Cutler et al., 2021). Additionly, the color and pattern features of *H. apiatus* are quite similar to those of *Hasarius adansoni* (Audouin, 1826), another salticid species present in Türkiye. Considering the widespread distribution and commonality of *H. adansoni*, there is also a high probability that these two species have been confused in previous field observations.

Ethics committee approval: Ethics committee approval is not required for this study

Conflict of interest: The authors declare that there is no conflict of interest.

Author Contributions: Conception – G.G., R.S.K.; Design – G.G., R.S.K.; Supervision: G.G., R.S.K.; Materials – G.G., R.S.K.; Analysis Interpretation – G.G., R.S.K.; Literature Review – G.G., R.S.K.; Writing – G.G., R.S.K.; Critical Review – G.G., R.S.K.

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