

# A new spider species from the group *Philodromus aureolus* (Araneae, Philodromidae) in Central Europe

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**Abstract:** The paper presents the description of a new spider species, *Philodromus buchari* nov. sp. (Philodromidae) from Central Europe. Its relationship to the other species of the *Ph. aureolus* group in mid-Europe is discussed. A key to these species occurring in the Czech Republic is provided: *Philodromus aureolus* (CLERCK 1757), *Ph. buchari* nov. sp., *Ph. cespitem* (WALCKENAER 1802), *Ph. collinus* C.L. KOCH 1835, *Ph. marmoratus* KULCZYNSKI 1891 (= *Philodromus buddenbrocki* BRAUN 1965, new synonym) and *Ph. praedatus* O.P.-CAMBRIDGE 1871.

**Key words:** Taxonomy, Philodromidae, *Philodromus buchari* nov. sp., Czech Republic.

## Introduction

Up to now, in studies of the arachnofauna of the renowned forest steppe locality at Dřínová hill (NNR Karlštejn), the main attention was given to the ground-layer fauna (BUCHAR & ŽDÁREK 1960). Information exists about rich populations of *Eresus cinnaberinus* (OLIVIER 1789), *Neon rayi* (SIMON 1875), *Alopecosa sulzeri* (PAVESI 1873), *Tricca lutetiana* (SIMON 1876) and others. The locality is also characterised by syntopic populations of *Atypus affinis* EICHWALD 1830 and *A. piceus* (SULZER 1776) (see ŘEZÁČ & KUBCOVÁ 2002). Presented here are our first results for the spiders living on branches of oaks (*Quercus* spp.). These are based on investigations over several years. Two species have already been recorded as new for the Czech Republic, namely *Porrhomma cambridgei* MERRETT 1994, and *Emblyna brevidens* (KULCZYNSKI 1897) (see THALER et al. 2003; KUBCOVÁ, in prep.). Rich populations of two lesser known species of the *Philodromus aureolus* group have also been observed. The results for *Ph. praedatus* O.P.-CAMBRIDGE 1871 will be presented separately (KUBCOVÁ, in press). The second species, described here as new, is *Ph. buchari* nov. sp. Females of this species resemble *Ph. cespitem*, but its males resemble *Ph. aureolus*. Be-

cause of this difficulty, comparative material of the Central European species of the *Ph. aureolus* group has been investigated. This material came mainly, not only, from the Czech Republic, but also from Slovakia, Austria and the former Yugoslavia. From these studies a new key has resulted for the separation of species of the *Ph. aureolus* group in the Czech Republic. Compared to the key of MILLER (1971), four more species are now included (*Ph. buchari* nov. sp., *Ph. cespitem*, *Ph. marmoratus*, *Ph. praedatus*).

## Survey of current knowledge

For an analysis of what is known about the species of the *Ph. aureolus* group see SEGERS (1992) and MUSTER & THALER (this volume). Although based on the important work of BRAUN (1965), the taxonomic approach is now different. Instead of using trinomials or even quadrinomials, as it has been often done since CHYZER & KULCZYNSKI (1891), taxa are now conceived as separate species, provided they can be distinguished, at least, by small but reasonably constant morphological characters in the copulatory organs. As a result of his studies, SEGERS reported ten species of this group in the West Palaearctic region: *Ph. aureolus* (CLERCK 1757), *Ph. buddenbrocki* BRAUN

1965, *Ph. buxi* SIMON 1884, *Ph. cespitum* (WALCKENAER 1802), *Ph. collinus* C.L. KOCH 1835, *Ph. fuscolimbatus* LUCAS 1846, *Ph. lividus* SIMON 1875, *Ph. longipalpis* SIMON 1870, *Ph. praedatus* O.P.-CAMBRIDGE 1871, *Ph. vagulus* SIMON 1875.

For the philodromid fauna of the Czech Republic, the monograph of CHYZER & KULCZYNSKI (1891) is of primary importance, since it deals with this group in the immediate vicinity, of Slovakia and Hungary. Again, following SEGERS (1992), the species of the *Ph. aureolus* group listed there are as follows: *Ph. vagulus* (= *Ph. alpestris* L. KOCH 1876), *Ph. collinus*, *Ph. aureolus* (= *Ph. a. verus*, *Ph. a. var. variegatus*), *Ph. cespitum* (= *Ph. a. caespiticola*, *Ph. a. similis*), *Ph. longipalpis* (= *Ph. a. pallens*) and *Ph. buddenbrocki* (= *Ph. a. marmoratus*, see below). Another subspecies, *Ph. a. rufolimbatus*, was not mentioned by SEGERS. As there was no recent material available (GAJDOŠ et al. 1999; SAMU & SZINETÁR 1999), BRAUN (1965) studied this subspecies from museum material, which consisted only of juveniles and females. The epigynum is illustrated rather schematically in CHYZER & KULCZYNSKI (1891: Fig. 4/23a) and no significant diagnostic character is given in the text. The male, however, might be identified by its small intermediate apophysis, resembling that of *Ph. fuscolimbatus* and *Ph. lividus* respectively (see SEGERS 1992: Fig. 7a, 12a-14a; MUSTER & THALER, this volume). Two other species, included in CHYZER & KULCZYNSKI (1891), apparently do not exist in the Czech Republic and will not be considered here: *Ph. vagulus*, *Ph. longipalpis*. Another two taxa must be considered separately, namely *Ph. aureolus marmoratus* and *Ph. a. var. variegatus*.

*Ph. a. marmoratus*: MILLER (1971: Fig. 16/16, 17/13) provided excellent drawings of the copulatory organs of both sexes from Slovakia (Nitra, see archive J. BUCHAR). These drawings correspond perfectly to the figures in the original description; moreover, the specimens came from the type region. These drawings apparently also match *Ph. buddenbrocki* BRAUN (1965: Fig. 79-80). Consequently this species must be regarded as a new synonym as already proposed by SEGERS (1992). Recently *Ph. buddenbrocki*

has been mentioned as a synonym of *Ph. fuscolimbatus* (see PLATNICK 2003) and must now be re-considered.

*Ph. a. var. variegatus* was separated from the nominate form by virtue of differences in colour, whilst no difference was noticed in the epigynum. Consequently the female might belong to *Ph. praedatus*. Since the single male was only doubtfully assigned to this subspecies, male characters do not provide a safe basis for considering the taxonomic value of this species. In BRAUN (1965), three male palps and one epigynum are figured for this species. Only one palp (Fig. 17a, b) corresponds fully to the original drawing, the other two can be assigned to *Ph. praedatus* (Fig. 20) and to *Ph. aureolus* (Fig. 19) respectively. Drawings of the epigynum/vulva (Fig. 18a, b) were made from a specimen from Orsova, which had been identified by KULCZYNSKI himself, but which BRAUN, nevertheless, identified as *Ph. aureolus*. Scarcity of material did not allow a solution to this problem. However, from the description the *Ph. a. var. variegatus* female cannot be separated from *Ph. aureolus*, whereas the male described by CHYZER & KULCZYNSKI (1891: Fig. 4/19c) might belong to *Ph. buchari* nov. sp.

According to present knowledge, five species of the *Ph. aureolus* group exist in the Czech Republic: *Ph. aureolus*, *Ph. cespitum*, *Ph. collinus*, *Ph. marmoratus*, *Ph. praedatus*, to which now must be added *Ph. buchari* nov. sp. (BUCHAR & RŮŽIČKA 2002; BRYJA et al., in prep.). Three more species exist in adjacent regions: *Ph. vagulus*, a mountain species, preferring the subalpine zone (Alps, High Tatra); *Ph. longipalpis*, the northernmost localities in S. Slovakia; *Ph. buxi*, a Mediterranean species, whose range probably extends to mid-Europe. Both of the latter species might also occur in the Czech Republic.

## Methods, abbreviations

**Measurements:** in mm.

**Abbreviations:** coll. = collection; collecting method: b = beating; e = in arboreal photo-elector; h = hand collecting; p = paper trap; juv. = juvenile specimen; NNM = National Nature Monument; NNR = National Nature Reserve; NR = Nature Reserve; grid square number indicated in

[]. ITA, RTA, VTA = intermediate, retrolateral, ventral tibial apophysis, respectively.

**Depository:**

AK coll. Antonín KŮRKA, National Museum, Prague

EŽ coll. Eva ŽDÁRKOVÁ, Research Institute of Crop Production, Prague

FM coll. František MILLER, National Museum, Prague (see KŮRKA 1997)

JB coll. Jan BUCHAR, Faculty of Natural History, Charles University, Prague

JD coll. Jan DOLANSKÝ, East-Bohemian Museum, Pardubice

JM coll. Jaroslav MARTÍNEK, Faculty of Natural History, Charles University, Prague

MŘ coll. Milan ŘEZÁČ, private collection, Prague

PB coll. Petr BÍLEK, Regional Museum of Hradec Králové

PK coll. Pavel KASAL, private collection, Prague

VB coll. Vítězslav BRYJA, private collection, Brno

VR coll. Vlastimil RŮŽIČKA, Institute of Entomology, České Budějovice

ZM coll. Zdeněk MAJKUS, Ostrava University, Ostrava

If not stated otherwise, material belongs to the author (Faculty of Natural History, Charles University, Prague).

**Spination:** In the description of *Ph. buchari* nov. sp., leg spines for single specimens are given when different from those of the general pattern of species of the *Ph. aureolus* group. The general pattern (GP) may be described as follows (AS, DS, PLS, RLS, VS = apical, dorsal, prolateral, retrolateral, ventral spines, respectively; a = apical; b = basal):

Fe I-IV: AS 3, DS 2; Fe I-III PLS 2, RLS 3; Fe IV RLS 1 [♂], PLS 2, RLS 2 [♂]

Pt I-IV: DSb 1, PLS 2, RLSb 1

Ti I-IV: DS 3, PLS 3, RLS 3, VS 2 pairs, AS 1 pair

Mt I-IV: DSb 1, PLS 2, RLS 2, VS 2 pairs; Mt I-II AS 4; Mt III-IV AS 5

**Comparative material:**

*Philodromus aureolus*: Czech Republic: 3♂♂ 6♀♀; 6♂♂ 26♀♀, AK; 1♂ 2♀♀, EŽ; 2♂♂ 6♀♀, FM; 4♂♂ 14♀♀, JB; 1♂ 3♀♀, JD; 1♂ 1♀, JM; 5♂♂ 10♀♀, MŘ; 2♂♂ 3♀♀, PB; 2♂♂ 7♀♀, VB; 1♀, ZM. Slovakia: 1♂, FM; 2♂♂ 1♀, PB.

*Philodromus cespitum*: Czech Republic: 1♂ 1♀; 12♂♂ 32♀♀, AK; 1♀, EŽ; 4♂♂ 5♀♀, FM; 8♂♂ 9♀♀, JB; 9♂♂ 5♀♀, JD; 4♂♂ 12♀♀, JM; 6♂♂ 7♀♀, MŘ; 14♂♂ 19♀♀, PB; 7♂♂ 14♀♀, VB. Slovakia: 14♂♂ 20♀♀, EŽ; 9♀♀, FM; 2♂♂ 1♀, PB; 1♀, VB.

*Philodromus collinus*: Czech Republic: 2♀♀; 4♀♀, AK; 2♂♂, FM; 1♂ 1♀, JB; 2♂♂, MŘ; 1♂ 5♀♀, VB.

*Philodromus longipalpis*: Slovakia: 3♀♀, PB; 1♀, EŽ. Yugoslavia: 1♂ 1♀, PB.

*Philodromus marmoratus*: Czech Republic: Southern Moravia, Lednice, 29 June 1994, from reed-warbler, 1♂, VB. Slovakia: Latorica, Leles, 5.-7 June 1960, 1♀, EŽ; Nitra (Miller's drawings of both sexes, MILLER 1971: Fig. 16/16, 17/13, archive J. Buchar).

*Philodromus praedatus*: Czech Republic: 5♂♂ 22♀♀; 2♂♂ 2♀♀, AK; 1♂ 2♀♀, FM (sub. *Ph. aureolus*); 4♂♂ 3♀♀, JB; 1♂, JD; 3♂♂, MŘ; 2♀♀, PK. Slovakia: 2♀♀, PB.

*Philodromus vagulus*: Slovakia: 1♀, JB. Austria: 1♀, JB.

## The species of the *Philodromus aureolus* group in the Czech Republic

When describing a new species in this group, it is important to consider the high variability in colour, pattern, and details of structures of the copulatory organs, characters which are important for identification. Before the description, the new species will be placed in a key for the *Ph. aureolus* group. From material preserved in alcohol, it is mainly the pattern and not the colour which can be evaluated, since specimens which have been stored for a long time tend to fade. This can be seen clearly when comparing photographs of a fresh female with a stored specimen (cp. Fig. 2a vs. 1a-c). The elements of the general pattern of cephalothorax and abdomen are valid for all species of this group (Fig. 4), whilst the extent of contrast in this pattern may vary noticeably. This is clearly illustrated in the paragraph concerned with the variability in female pattern of *Ph. buchari* nov. sp. However, in some species, rather specific features can be observed, although not necessarily in all specimens of a given species, see SNAZELL (1976: 230), SEGERS (1990: 12), HARVEY (1991: 62), BRYJA et al. (in prep.). A basic difference between living males and females, is the iridescence of males, which is created by special scales. This metallic shimmer can rarely be observed in specimens kept in alcohol (Fig. 3c). Basically, the pattern of males is much less contrasting than that of females. In the cephalothorax of males, the pale central longitudinal band is usually very weak, either fading into the lateral bands, or, at least, becoming mottled. The typical V mark at the end of the cephalic part of this longitudinal band is usually more or less reduced.



Fig. 1a–c: *Philodromus buchari* nov. sp., Holotype female, stored in alcohol. a: dorsal; b: carapace; c: abdomen.

Fig. 2a–c: *Philodromus buchari* nov. sp., Paratype female, freshly preserved. a: dorsal; b: ventral; c: alive.



Male abdomens are rather dark, in comparison with most females, and its whitish spots are considerably limited. Female abdomens, however, show much smaller, dark spots and whitish or pale brown colours prevail.

For the main characters of the epigynum, the female copulatory organ, see Figures 5, 6. Specific differences of primary importance can be recognized in the structure of its median septum, which is laterally limited by sclerotised epigynal folds. The median septum is convex posteriorly and partly hairy, while, in its anterior part, a small concave atrium may be present. In most species, a clear boundary exists between both parts of the septum. This is called the epigynal arch. This arch is absent only in *Ph. aureolus*. In *Ph. buchari* nov. sp. (Fig. 14d), *Ph. cespitum* (Fig. 12c), and *Ph. praedatus* (Fig. 10d), this boundary is present also in the dorsal view of the vulva, as an internal, sclerotised arch. This internal arch is formed by reinforced cuticle at the bottom of the median septum, between the orifices of the copulatory ducts, which are concealed by the sclerotised epigynal folds. In cross section this arch is revealed as an invagination of the cuticle (Fig. 8), pointing horizontally in *Ph. cespitum* and *Ph. buchari* nov. sp., and vertically in *Ph. praedatus*. In *Ph. collinus* and *Ph. marmoratus* there is no invaginated internal arch.

For the main characters of the male copulatory organ see Figure 7.

The six species of the *Ph. aureolus* group found in the Czech Republic may be separated by using the following key. If not stated otherwise, male palps, preferably detached from the cephalothorax, should be investigated from the ventral view. For identification of females, it is necessary to remove any postcopulatory marks from the epigynal septum.

- |   |   |                      |
|---|---|----------------------|
| 1 | ♂♂  | 2                    |
| - | ♀♀  | 7                    |
| 2 | Palpal tibia with two apophyses. VTA longer than wide, snake-head shaped, its centre wider than its base (Fig. 9a) . . . . .                                      | <i>Ph. collinus</i>  |
| - | Palpal tibia with three apophyses . . . . .   | 3                    |
| 3 | Distal margin of VTA broken, forming a separate tooth at its retrolateral angle (Fig. 10a). Distal half of RTA bevelled in retrolateral view (Fig. 10b) . . . . . | <i>Ph. praedatus</i> |



Fig. 3a–c: *Philodromus buchari* nov. sp., Paratype male. a: dorsal; b: carapace; c: abdomen.



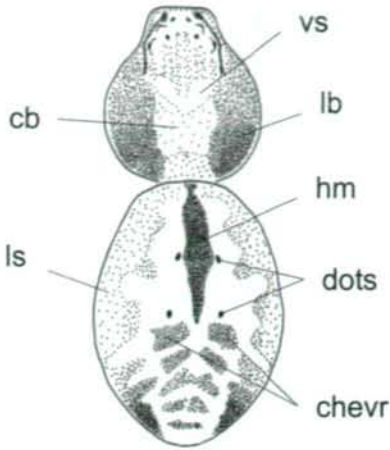


Fig. 4: Body pattern of *Philodromus aureolus* group, dorsal. cb = pale central band; chevr = chevrons (pairs of cross spots); dots = impressed dots; hm = cardiac mark; lb = dark lateral band; ls = dark lateral spots; vs = white V spot.

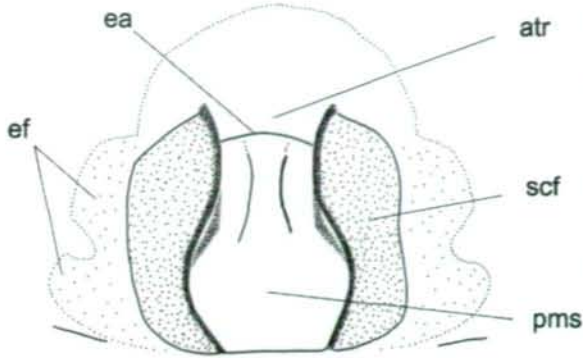


Fig. 5: *Philodromus buchari* nov. sp., female epigynum. atr = atrium; ea = epigynal arch; ef = lateral lobes of epigynal field; pms = posterior median septum; scf = sclerotised epigynal fold.

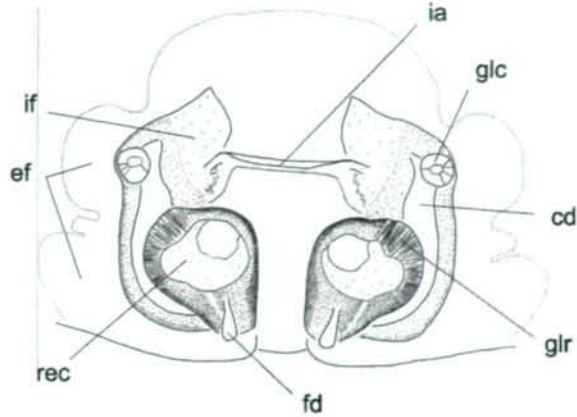


Fig. 6: *Philodromus buchari* nov. sp., female vulva. cd = copulatory duct; ef = lateral lobes of epigynal field; fd = fertilization duct; glc = glandular head attached to copulatory duct; glr = glandular region of receptacle; ia = internal sclerotised arch; if = internal fold; rec = seminal receptacle.

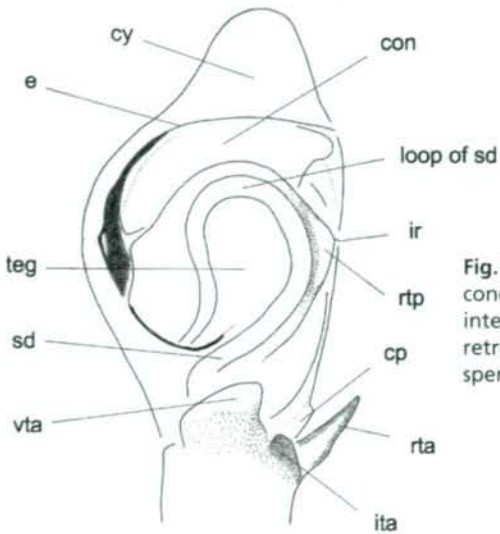
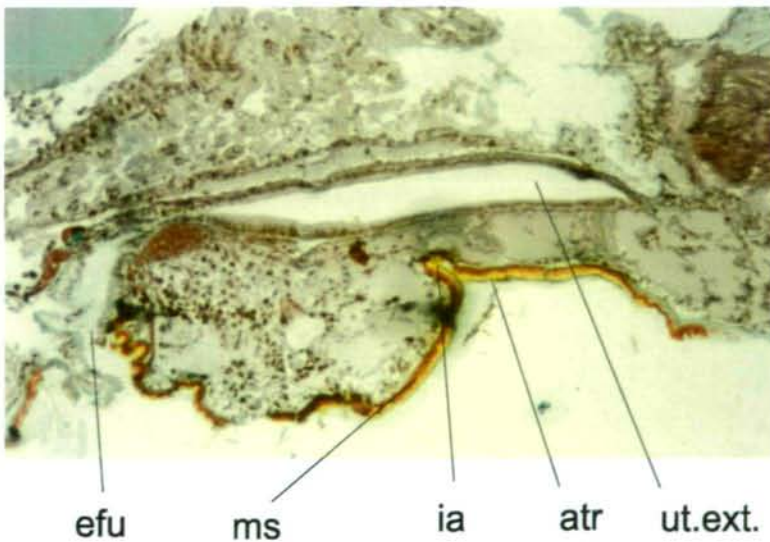


Fig. 7: *Philodromus buchari* nov. sp., male palpal organ. con = conductor; cp = cymbial process; cy = cymbium; e = embolus; ir = intertegular retinaculum; ita = intermediate tibial apophysis; rta = retrolateral tibial apophysis; rtp = retrolateral tegular projection; sd = sperm duct; teg = tegulum; vta = ventral tibial apophysis.

Fig. 8: *Philodromus buchari* nov. sp., longitudinal section of epigynum. atr = atrium; efu = epigastric furrow; ia = internal sclerotised arch (invagination of cuticle); ms = median septum; ut. ext. = uterus externus.



- Distal margin of VTA continuous, RTA of other shape ..... 4
- 4 Retrolateral tegular projection extending into a conspicuous triangular shape (Fig. 11a). RTA very slender, pointed, almost stick-like in retrolateral view (Fig. 11b). ..... *Ph. marmoratus*
- Retrolateral tegular projection otherwise. RTA broader ..... 5
- 5 ITA slender, almost as long as wide. Loop of sperm duct almost closed (Fig. 12a). ..... *Ph. cespitum*
- ITA wider than high. Loop of sperm duct widely open towards base of palpal organ. . 6
- 6 Distal margin of VTA almost horizontal. Retrolateral tegular projection short, intertegular retinaculum not visible in ventral view (Fig. 13a). Tip of RTA pointing retrolaterally, well discernible in sublateral view (Fig. 13b) ..... *Ph. aureolus*
- Distal margin of VTA prolaterally oblique. Retrolateral tegular projection arched, intertegular retinaculum visible in ventral view (Fig. 14a). Tip of RTA pointing to palpal organ, as seen in sublateral view (Fig. 14b) ..... *Ph. buchari* nov. sp.

- 7 Median septum scarcely half as long as epigynal field. Lateral epigynal folds, short, wide, kidney-shaped (Fig. 9b). Vulva, copulatory ducts (in dorsal view) as long as seminal receptacle or slightly longer (Fig. 9c) ..... *Ph. collinus*
- Median septum almost as long as epigynal field. Lateral epigynal folds elongate. Vulva, different. .... 8
- 8 Epigynal folds strongly diverging anteriorly (Fig. 11c). Vulva, copulatory ducts running vertically, therefore hidden (in dorsal view) by seminal receptacles, proximal part of fertilization ducts more sclerotised than usual (Fig. 11d) ..... *Ph. marmoratus*
- Epigynal folds parallel or converging anteriorly. Vulva, with major part of copulatory ducts running horizontally, clearly visible . 9
- 9 Median septum without arch, copulatory ducts straight (Fig. 13 c–d) . . . . *Ph. aureolus*
- Median septum present, forming, (in dorsal view) an internal sclerotised arch. (In *Ph. praedatus* this arch may be inconspicuous; forming a cross-ridge in the anterior quarter of the median septum and sometimes accompanied by other ridges) . . . . . 10
- 10 Epigynal field broad, extending laterally, as strongly pigmented as lateral epigynal folds (Fig. 14c). Vulva, copulatory ducts initially straight, visible in full length, as is also the final almost perpendicular bend in the ducts towards the seminal receptacles (Fig. 14d) ..... *Ph. buchari* nov. sp.
- Epigynal field different. Vulva, copulatory ducts different . . . . . 11
- 11 Epigynal field triangular, lateral lobes widening posteriorly. Posterior median septum longer than wide, atrium with one or more cross-ridges (Fig. 10c). Vulva, copulatory ducts S-shaped. Copulatory ducts at same level as seminal receptacles, clearly visible (Fig. 10d) ..... *Ph. praedatus*
- Epigynal field narrow, lateral lobes inconspicuous. Posterior median septum subquad-rangular, atrium without cross-ridges (Fig. 12b). Vulva, copulatory ducts, (in dorsal view) straight and almost entirely covered by seminal receptacles (Fig. 12c) . . *Ph. cespitum*

**Holotype:** ♂ Czech Republic, Central Bohemia: Srbsko, NNR Karlštejn, Dřínová hill [6050], 380 m, forest steppe, 26.6.2002, h.

**Paratypes:** same locality as holotype: 1 ♂, 5.7.2000, on bark, p. 2♂♂, 21.5.2001, b. 1 subad. ♂, 21.5.2002 (adult 30.5.2002), h. 4 ♀♀, 17.6.2002, h. 1 ♀, 9.6.2002, h. 2 ♀♀, 26.6.2002, h. 1 ♀, 29.7.2002, h. 1 juv., 29.7.2002 (adult ♂ 26.12.2002), h. 2 juv., 1.10.2002 (adult ♂♂, 10.1.2003, 20.1.2003), h. 2 ♀♀, 26.5.2003, b. 1 ♀, 4.6.2003, h.

**Depository of type specimens:** Author's collection, Faculty of Natural History, Charles University, Prague.

**Other material:** Central Bohemia: Dřínová hill (6050), from full-grown oak-hornbeam forest: 2 ♀♀, 19.7.-29.8.1999, e. 2 ♀♀, 14.10.1999 (between paper tapes). 1♂, 26.5.-5.7.2000, e. 1♂, 13.6.2001, b. 1♂, 3-28.6.2001, e. Srbsko, NNR Karlštejn, Králova studně [6050], 31.5.2002, 1 ♀, MŘ. Eastern part of Labe lowlands, around Nový Bydžov [5758], 1971-1975, 1♂ 2 ♀♀, PB.

Southern Moravia: Pavlov, NNR Děvín hill [7165], south oriented slope, 22.6.1966, 1 ♀ (heavily pigmented), sweeping, JB. Valtice, NNM Rendezvous [7266], Turkey oak forest, 1 ♀, PK. Hodonín – Radějov, NNR Čertoryje [7170], 400 m, 30.6.1995, 1 ♀, VR. Mikulov: NR Svatý Kopeček [7165], 11.6.1999, 1♂ 3 ♀♀, VB. Without locality, 1♂, EŽ.

Slovakia: Podzámčie, 1 ♀, FM (sub *Ph. cespitum*). Štúrovo: Kamenica nad Hronom, Kováčovské kopce [8178], 10.-18.7.1972, 1 ♀, PB.

**Derivatio nominis:** This species is respectfully dedicated to my teacher, Professor RNDr. Jan BUCHAR, Dr. Sci.

**Diagnosis:** *Ph. buchari* nov. sp. clearly belongs to the *Ph. aureolus* species group, and can be recognized by specific characters present in epigynum and vulva of females, and in tibial apophyses, tegular projection and intertegular retinaculum of male palps.

♀ **Holotype:** Total length 7.5. Carapace (Fig. 1b), length 2.8, width 2.7; lateral border with narrow whitish margins; lateral bands dark brown, providing a mottled appearance; central band pale, grey-brown, with whitish V-shaped mark in the middle. Ocular area, reddish-brown, with whitish spot in its middle, surrounded by a narrow dark line. Sternum, pale yellow. Eyes, PLE>AME>ALE=PME; eye arrangement, AME-ALE 0.13, AME-AME 0.22, PME-PME 0.38, PME-PLA 0.27, AME-PME 0.27, ALE-PLA 0.29; length of the eye rows, AER 0.76, PER 1.08.

## Description of *Philodromus buchari* nov. sp.

*Ph. aureolus* var. *variegatus* KULCZYNSKI 1891, Araneae Hungariae 1: 109, ♂ only ("an re vera huius varietatis ?")

*Ph. aureolus* var. *variegatus* – BRAUN 1965, Senckenbergiana biologica 46: 381, Abb. 17 a (specimen from Bad Reichenhall, det. SCHENKEL).

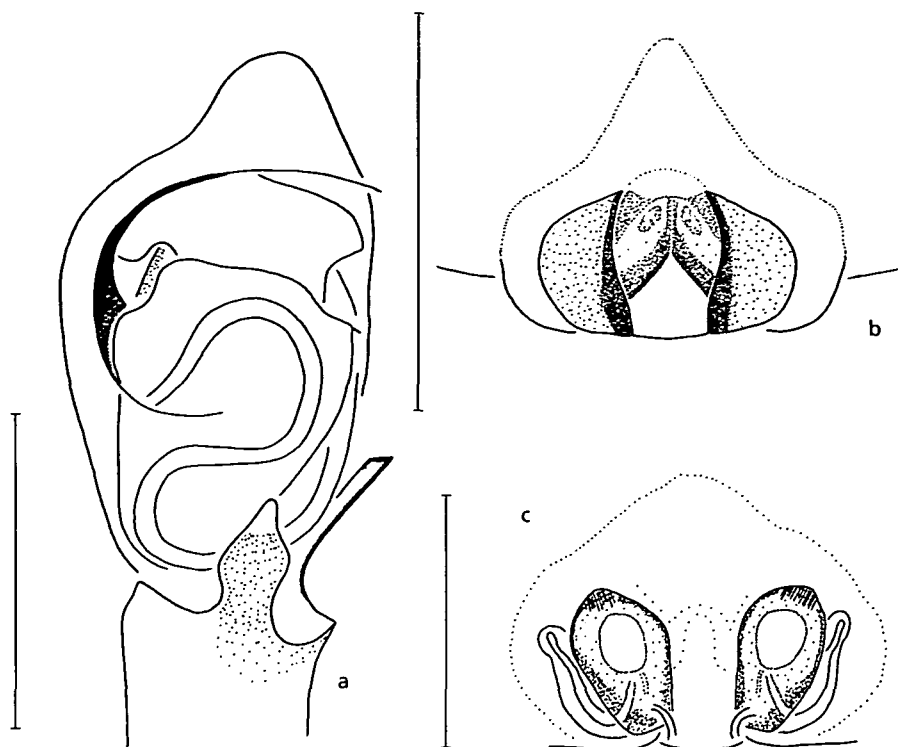


Fig. 9a-c: *Philodromus collinus*. a: male palp, ventral view; b: epigynum; c: vulva. Scale lines 0.5 mm (a, b), 0.2 mm (c).

Chelicerae, dark brown. Pedipalps, length 3.03 (0.97 + 0.56 + 0.58 + 0.91); palpal tarsus markedly yellow-brown. Legs, II/I/III/IV; pale yellow, distal end of femora and both ends of tibiae with reddish-brown annulation, metatarsi and tarsi dark. In the annulations, minute dark spots around the bases of bristles are present, spots which can be found also outside the annulations. Leg spines, Fe: GP, exceptions Fe III, right, 1 RLS missing; left, 2 RLS missing; Fe IV, left, RLS absent. Pt: GP. Ti: GP, exceptions Ti IV, medial DS missing. Mt: GP, exceptions Mt I, left, b RLS missing; Mt III, left, additional AS. Ta III, left, 1 DS (!). Ventral side of all Ta with bands of scopula hairs, reaching distal part of Mt on legs I, II. Length of leg segments:

	Fe	Pt	Ti	Mt	Ta	Total
I	3.12	1.49	2.70	2.43	1.26	11.00
II	3.49	1.59	3.10	2.72	1.46	12.36
III	2.91	1.16	2.13	2.04	1.01	9.25
IV	2.91	0.97	2.13	2.13	0.97	9.11

Abdomen (Fig. 1c): narrow, two pairs of impressed dots present. Cardiac mark; dark brown, surrounded by whitish rim, which continues as a whitish longitudinal band to the spinnerets, and crosses a series of five paired transverse spots (chevrons). Dorsum

of abdomen, laterally flanked by a series of pale brown spots; which, posteriorly, become darker. Ventral side of abdomen; whitish-grey, with dark longitudinal band stretching from epigastric furrow to spinnerets.

Epigynum (Fig. 14c): posterior part (c. 2/3 of its length) elevated; anterior part forming a wide depression. Median septum; pear-shaped, broadest at its posterior third, covered with tiny hairs bent backwards, its front part with a median keel. Atrium; as broad as broadest part of median septum. Epigynal folds; sclerotised, reddish-brown, with interior margins black. Epigynal field, forming two large lateral lobes alongside of the epigynal folds.

Vulva (Fig. 14d, paratype dissected): copulatory ducts; initially straight, before bending almost at right angles, towards seminal receptacle, inner margins only covered by receptacles. Seminal receptacles; globular, large and in dorsal position. Origin of fertilization duct, prominent. Because of their size, the receptacles are close to each other; their distance apart not exceeding half of their diameter. Internal sclerotised arch, distinct.

Variability: Total length, 5.25-8.75; carapace length, 2.44-3.38, width 2.50-3.25. Lateral bands; not evenly mottled, some specimens with conspicuous dark spot at posterior end, these spots even connected above the pedicel. In one female, distal leg annulations were not developed, but the legs entirely uniform reddish-brown. Two females were marked with two dorsal stripes on the femora instead of annulations. The tiny spots around base of bristles differed in intensity, being almost invisible in some specimens and very conspicuous in others. Pattern of abdomen in some specimens were reduced as in the holotype, whilst in others, chevrons behind the cardiac mark merge with the lateral spots, forming conspicuous transverse arcs. Epigynum and vulva, apparently are quite uniform. The posterior part of median septum presents some variation, since it may not be pear-shaped, quite wide in the front part, the keel becoming less distinct.

♂ Paratype: Total length, 6.0. Carapace (Fig. 3b), length, 2.7; width, 2.56; central



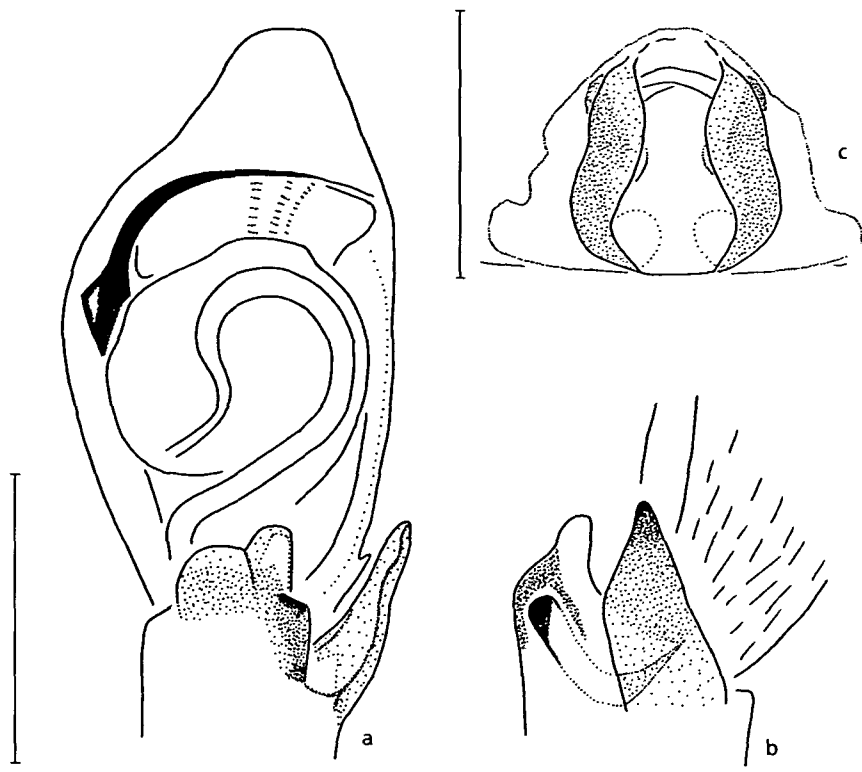


Fig. 10a–d: *Philodromus praedatus*. a: male palp, ventral view; b: tibial apophysis, retrolateral view; c: epigynum; d: vulva. Scale lines 0.5 mm, (a-c), 0.2 mm (d).

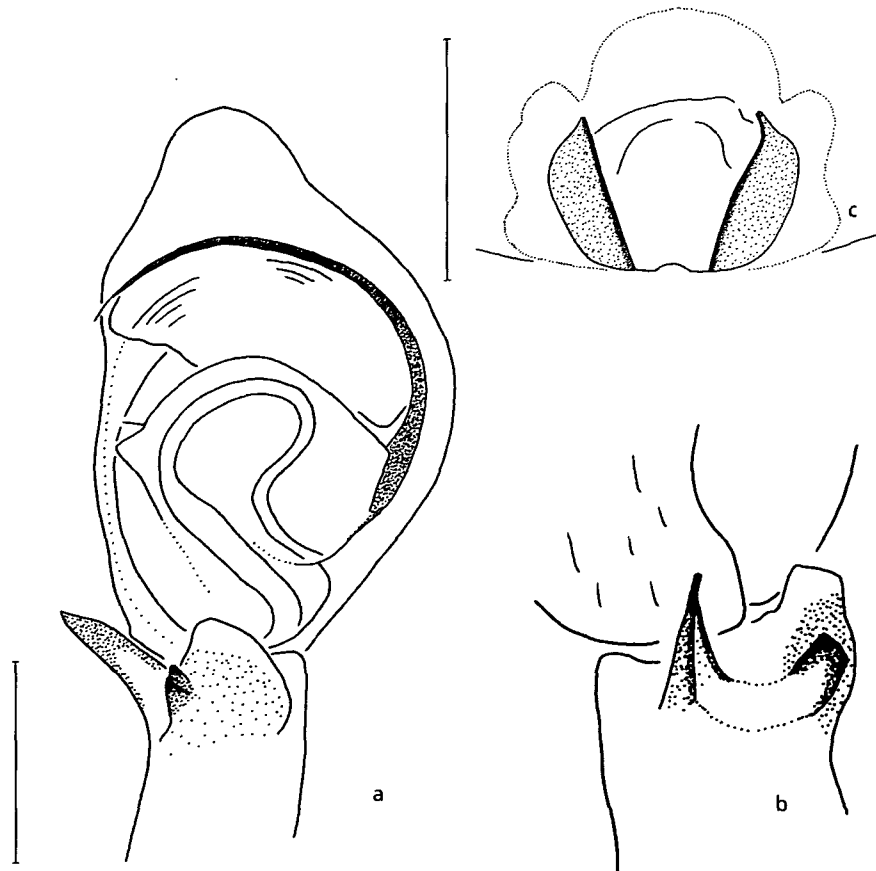
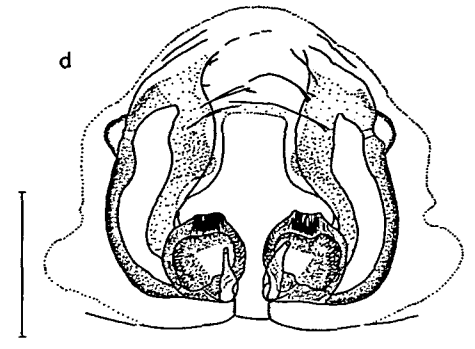
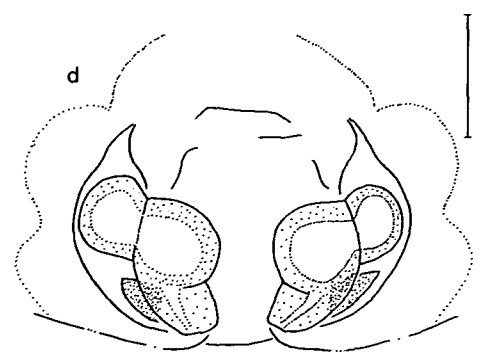


Fig. 11a–d: *Philodromus marmoratus*. a: male palp, ventral view; b: tibial apophysis, retrolateral view; c: epigynum; d: vulva. Scale lines 0.5 mm (a-c), 0.2 mm (d).



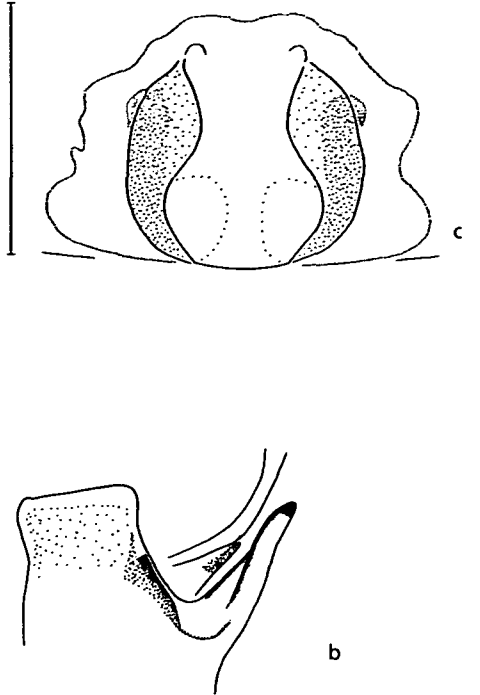
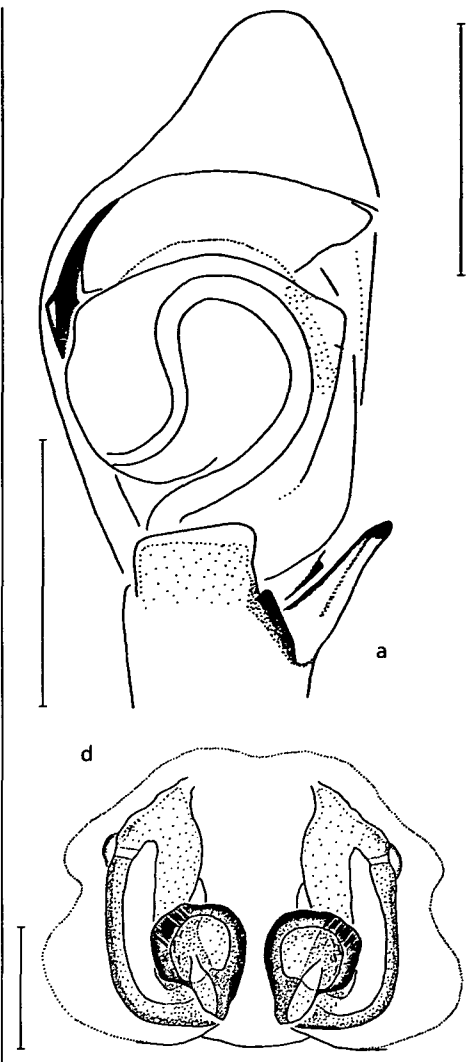
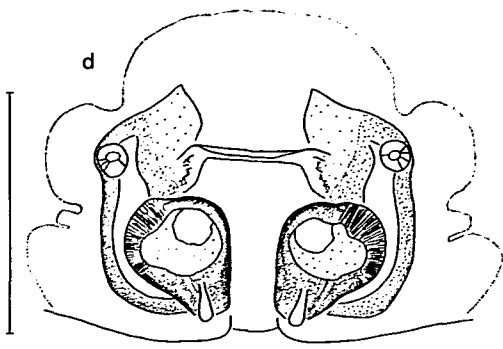
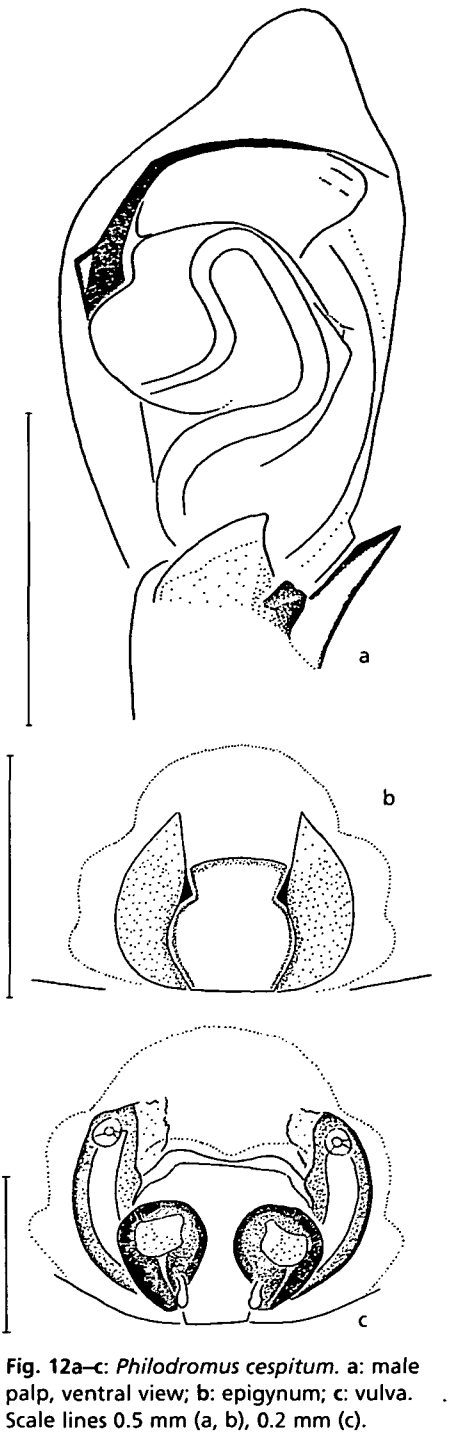


Fig. 13: *Philodromus aureolus*. a: male palp, ventral view; b: tibial apophysis, sublateral view; c: epigynum; d: vulva. Scale lines 0.5 mm (a-c), 0.2 mm (d).

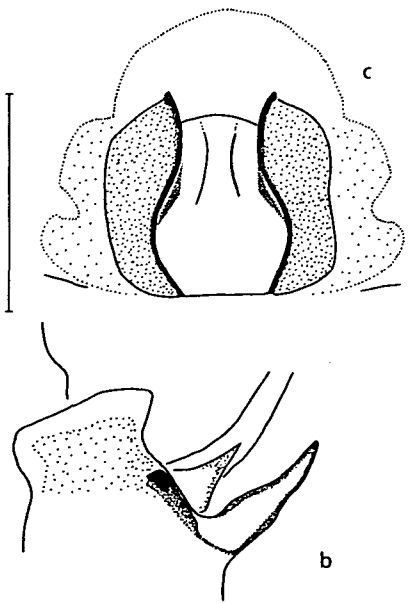


Fig. 14: *Philodromus buchari* nov. sp. a: male palp, ventral view; b: tibial apophysis, sublateral view; c: epigynum; d: vulva. Scale lines 0.5 mm (a-c), 0.2 mm (d).

pale band, strikingly more slender than in holotype. Eyes, AME > others; eye arrangement, AME-ALE 0.09, AME-AME 0.18, PME-PME 0.32, PME-PLE 0.22, AME-PME 0.22, ALE-PLE 0.25. Length of eye rows, AER 0.61, PER 1.94. Clypeus; almost uniformly brown. Chelicerae; pale brown, as are the cymbium and distal parts of the legs. Pedipalps, pale yellow; length, 4.02 (1.47 + 0.78 + 0.58 + 1.19).

Male palp (Fig. 14a, b): Cymbium; length 1.2, width 0.75, widest in embolar region, indicated by a noticeable prolateral bulge, distally widely rounded, and carrying two bundles of chemosensitive hairs. Palpal organ: Tegulum; widely oval, evenly rounded anteriorly; retrolateral tegular projection; arched; intertegular retinaculum; clearly visible, extending beyond tegular projection, its base surrounded by a whitish membrane, visible from retrolateral side; sperm duct; S-shaped, its loop widest towards base of palpal organ; embolus; smoothly curved; conductor; whitish, glossy, its apical end conspicuously oblique. Tibial apophyses: VTA; anterior margin prolaterally oblique. ITA; forming a comparatively long ledge, its prolateral (anterior) end prominent. RTA; long, slanted, pointing outward and forward, in ventral view inclined towards bulb.

Legs: II/I/VI/III; pale yellow; annulations (and tiny dark spots) inconspicuous. Leg spines: Fe GP, exceptions: Fe III, right 1 RLS missing. Pt GP, exceptions: Ti IV, bPLS missing. Mt GP, exceptions: Mt III, right AS reduced. All Ta with ventral scopulae less conspicuous than in holotype. Length of leg segments:

	Fe	Pt	Ti	Mt	Ta	Total
I	3.50	1.36	3.26	3.01	1.65	12.78
II	3.98	1.55	3.78	3.61	1.94	14.86
III	3.10	1.16	2.58	2.68	1.13	10.65
IV	3.10	1.16	2.52	2.70	1.18	10.66

Abdomen (Fig. 3c): Overall colour of abdomen less contrasting and cardiac mark, paler and wider than in holotype, although still the darkest area on the dorsal side of the abdomen.

Variability: Total length of males 5.0-6.60, carapace length 2.1-3.2, width 2.2-3.1. Due to prolonged conservation or to maceration, some males and females showed non-

contrasting colours and some even lacked any pattern. Live specimens of *Ph. buchari* nov. sp., however, display sexual dimorphism in both colour and pattern as in other species of the *Ph. aureolus* group (see above), with males, unlike females, showing a conspicuous metallic hue. Sexual dimorphism in *Ph. buchari* nov. sp. was also found in leg spines (see above, Fe IV: PLS, RLS). Legs IV show a wide variation in spination: apart from sexual dimorphism, the number of tibial spines may also decrease. Reduction of spines, both in number and size, can also be found on femora III in both sexes.

**Relationships:** As mentioned above, males of *Ph. buchari* nov. sp. are close to *Ph. aureolus*, while females resemble *Ph. cespitum*. As far as dimensions are concerned, copulatory organs are larger in *Ph. buchari* nov. sp. than in both of the other species (Fig. 15, 16). Those of only four males of *Ph. buchari* nov. sp. (two of them raised in captivity) appear among the size cluster of *Ph. aureolus* males. In females, the difference in size is even more apparent; since the size of only two *Ph. cespitum* females (both from southern Bohemia) stand within those of the *Ph. buchari* nov. sp. cluster.

Furthermore, *Ph. longipalpis* must now be considered and, from the literature only, *Ph. a. var. variegatus*. Comparison with a pair of *Ph. longipalpis*, taken together in Yugoslavia, enabled us to identify four females captured in Slovakia as true *Ph. longipalpis*. However, it will be necessary to investigate more specimens, before clear epigynal characters will be found, which separate females of *Ph. buchari* nov. sp. and *Ph. longipalpis*. In *Ph. buchari* nov. sp., the lateral lobes of the epigynal field are almost as dark as the sclerotised epigynal folds, whereas in *Ph. longipalpis* the folds are conspicuously darker than the lobes. Moreover, these epigynal folds seem to be slender and S-shaped in *Ph. longipalpis*. Seminal receptacles are at the same level as the copulatory ducts in *Ph. longipalpis* and therefore visible in full length, whereas in *Ph. buchari* nov. sp. they are located dorsal of the ducts and, therefore, partly cover the inner margins of the ducts. On average, females of *Ph. longipalpis* are smaller than *Ph. buchari* nov. sp. females. Finally, it should be noticed, that the male



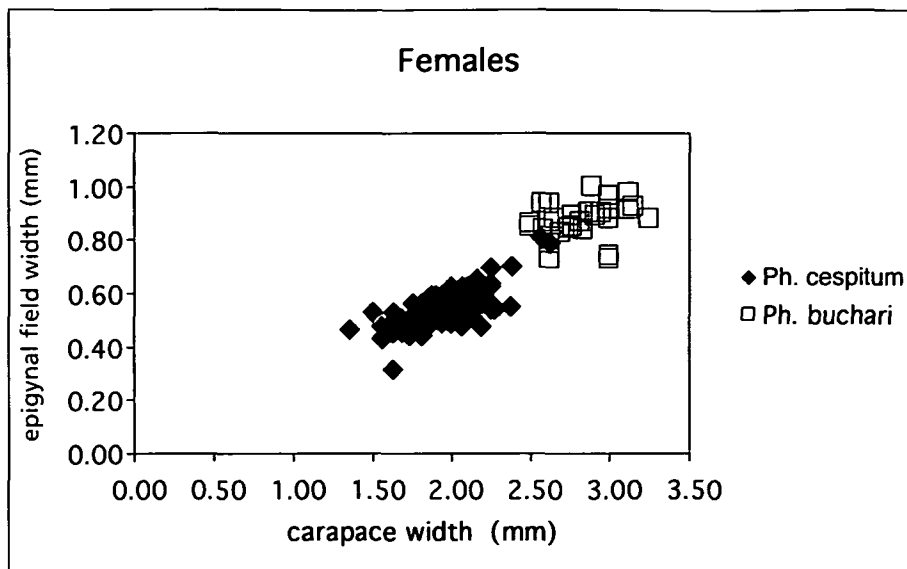
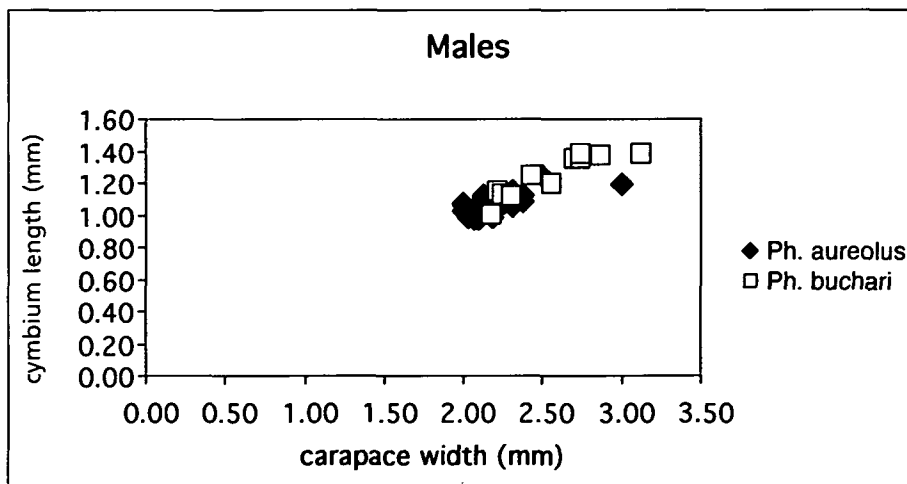


Fig. 15: Epigynal field width vs. carapace width in females *Ph. cespitum* (n = 135) and *Ph. buchari* (n = 29).

tentatively assigned to *Ph. a. var. variegatus* by CHYZER & KULCZYNSKI (1891: Fig. 4/19c), and which is currently synonymised with *Ph. aureolus*, belongs rather to *Ph. buchari* nov. sp., as is, also, the male, whose palp is figured by BRAUN (1965: Fig. 17a, b).

**Distribution and ecology:** In the Czech Republic, *Ph. buchari* nov. sp. is confined to the warmest regions (thermophyticum). The type locality is in its western part (Dřínová hill, NNR Karlštejn); other localities are in its eastern part (Nový Bydžov) and in the southern part of the Moravian thermophyticum (Unesco Biosphere Reserve Pálava, Hodonín). In the Czech Republic, *Ph. buchari* nov. sp. prefers natural habitats, such as forest steppe and rock steppe, at low altitudes, up to 400 m. *Ph. buchari* nov. sp. has also been collected at two xerothermic localities in Slovakia (see material) and has been recorded from France, Germany and Turkey by MUSTER &

Fig. 16: Cymbium length vs. carapace width in males *Ph. aureolus* (n = 29) and *Ph. buchari* (n = 11).



THALER (this volume). Two more localities can be added from the literature, Ujhely/Slovenske Nove Mesto (Slovakia, CHYZER & KULCZYNSKI 1891: 109); Bad Reichenhall (Bavaria, BRAUN 1965: 380).

Most specimens were collected on branches and leaves of *Quercus pubescens*, rarely on the trunks of *Quercus* sp. Females were found from end of May to mid July. Cocoons were guarded in curled leaves. Nine cocoons checked in June contained eggs or embryos (107 to 189, and in two cases, strikingly more, 232, 372). In a cocoon taken on 9 July there were, already, prelarvae present, but this cocoon had been parasitized. Males were found from the second half of May until June.

### Discussion

CHYZER & KULCZYNSKI (1891: 108) were the first to define the *Philodromus aureolus* group („cohors *Ph. aureoli*“). The tradition of KULCZYNSKI's approach was recently taken up again by BRAUN (1965) and SEGERS (1992). For a convincing identification of some old taxa described in this group, it is especially helpful to discover local populations of such species, as was the case in *Ph. praedatus* (see SEGERS 1990; HARVEY 1991), and now *Ph. buchari* nov. sp. 8 ♂♂ and 18 ♀♀ of this species were found in the course of a community study about the spiders on oaks on Dřínová hill, which thus became the type locality of this new species.

Lack of new material probably hindered the acceptance of *Ph. marmoratus*. Although this species was found by KULCZYNSKI in ten separate localities, no more captures were reported in the following years. This probably resulted in BRAUN (1965) describing this species as new, again, 74 years later (*Ph. budenbrocki*). New specimens have now been collected in Bulgaria, in Austria (JÄGER 1995), also in the Czech Republic and in Slovakia (BRYJA et al., in prep.). SEGERS (1992) considered eight further species as „insufficiently known taxa“. Currently, two of them, *Ph. mistus* BLACKWALL 1837 and *Ph. vegetus* L. KOCH 1881, are considered as nomina dubia (PLATNICK 2003). Another species, *Ph. auronitens* AUSSERER 1867, should be accepted as a synonym of *Ph. colli-*

nus (see CHYZER & KULCZYNSKI 1891: 108; THALER 1991), as well as *Ph. variatus* BLACKWALL 1837 (according to PLATNICK 2003). In PLATNICK's world catalogue, independent status is still left to the taxa *Ph. depriesteri* BRAUN 1965, considered by SEGERS (1992) as a "subadult or teratological specimen of *Ph. collinus*", and to *Ph. collinus isticus* BRAUN 1965. Yet another species which clearly belongs the *Ph. aureolus* group, is *Ph. micans* MENGE 1875, which was illustrated also by BÖSENBERG (1903: Fig. 31/491a-c) from a specimen identified by MENGE himself. The identity of this species, however, cannot be settled from the information available for its type specimens. Finally, *Ph. inauratus* DAHL 1924, must be regarded as a nomen nudum. It was placed as a synonym of *Ph. aureolus* by BONNET (1958). For further notes about these nominal species, see also MUSTER & THALER (this volume).

The *Ph. aureolus* species group also exists in the Nearctic region, see DONDALE & REDNER (1976). Twelve species of this group occur in this region, but only one species is Holarctic, *Ph. cespitum*. All others differ clearly from European species in characters of the copulatory organs. According to MIKHAILOV (1997), four species are present in the Eastern Palaearctic region (*Ph. aureolus*, *Ph. buxi*, *Ph. cespitum*; and in the mountains of southern Siberia *Ph. praedatus*), together with *Ph. subaureolus*, which is only known from the Far East (see BRAUN 1965; YAGINUMA 1977).

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## Zusammenfassung

Eine neue Spinnenart der *Philodromus aureolus*-Gruppe (Araneae, Philodromidae) in Mitteleuropa. In dieser Arbeit wird eine neue Art der Gruppe *Philodromus aureolus* aus der Tschechischen Republik beschrieben, *Philodromus buchari* nov. sp. (Philodromidae). Ihre Beziehungen zu den anderen in Mitteleuropa vorhandenen Arten der Gruppe wird diskutiert und ein Schlüssel zu den Arten der Tschechischen Republik vorgeschlagen: *Philodromus aureolus* (CLERCK 1757), *Ph. buchari* nov. sp., *Ph. cespitum* (WALCKENAER 1802), *Ph. collinus* C.L. KOCH 1835, *Ph. marmoratus* KULCZYNSKI 1891 (= *Philodromus buddenbrocki* BRAUN 1965, new synonym) und *Ph. praedatus* O.P.-CAMBRIDGE 1871.

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