

Chromosomes of *Phaenoglyphis villosa* (Hartig, 1841) (Hymenoptera: Figitidae)

Хромосомы *Phaenoglyphis villosa* (Hartig, 1841) (Hymenoptera: Figitidae)

V.E. Gokhman
В.Е. Гохман

Botanical Garden, Moscow State University, Moscow 119992, Russia. E-mail: gokhman@bg.msu.ru
Ботанический сад, Московский государственный университет, Москва 119992, Россия.

KEY WORDS: Hymenoptera, Figitidae, Charipinae, *Phaenoglyphis villosa*, chromosomes, karyotype.

КЛЮЧЕВЫЕ СЛОВА: Hymenoptera, Figitidae, Charipinae, *Phaenoglyphis villosa*, хромосомы, кариотип.

ABSTRACT: Chromosomes of a gall wasp from the subfamily Charipinae, *Phaenoglyphis villosa*, are studied for the first time. The species has $2n = 20$. All chromosomes of the karyotype are biarmed and slowly decrease in size. Chromosomal features of Figitidae and other members of the superfamily Cynipoidea are discussed.

РЕЗЮМЕ: Впервые изучены хромосомы орехотворки *Phaenoglyphis villosa* из подсемейства Charipinae. У этого вида обнаружено $2n = 20$. Все хромосомы в кариотипе двуплечие, постепенно убывают по размерам. Обсуждены особенности хромосомных наборов Figitidae и других представителей надсемейства Cynipoidea.

The family Figitidae is a moderately sized group belonging to the superfamily Cynipoidea. It contains about 130 genera and more than 1400 species [Ronquist, 1999]. However, this group is very poorly touched by karyological investigation. Specifically, chromosomes of only two species of Figitidae belonging to the subfamilies Eucoilinae and Figitinae were studied previously [Gokhman, 2003]. I managed for the first time to study karyotype of *Phaenoglyphis villosa* (Hartig, 1841) from the subfamily Charipinae, a very common parasite of various members of the subfamily Aphidiinae (Braconidae) on aphids (O.V. Kovalev, personal communication; see also [Gauld & Bolton, 1988]).

Materials and methods

Individuals of *Ph. villosa* parasitizing *Aphidius matricariae* Haliday, 1834 on *Aphis fabae* Scopoli, 1763 (a laboratory culture maintained at the Polar-Alpine Botanical Garden-Institute, Kirovsk, Russia) in March 2005 were used in this study. Chromosome preparations were obtained from cerebral ganglia of prepupae ac-

ording to the technique described by Imai et al. [1988]. Cell divisions were studied and photographed with the optic microscope Zeiss Axioskop 40 FL fitted with the digital camera AxioCam MRc. To obtain karyograms, the resulting images were processed with the image analysis program AxioVision version 3.1 and Adobe Photoshop version 6.0. Chromosomes were classified according to the works by Levan et al. [1964] and Imai et al. [1977]. Arm number (NF) was also calculated. Parasitic wasps were identified by the author, the identification was confirmed by O.V. Kovalev (Zoological Institute, St. Petersburg, Russia). Voucher specimens are deposited in the Zoological Museum, Moscow State University, Moscow, Russia.

Results and discussion

Chromosome preparations of *Ph. villosa* showed $2n = 20$ (Fig. 1). All chromosomes are metacentric and therefore NF = 40. Chromosomes slowly decrease in size, with their first to fourth pairs being slightly longer and the last pair substantially shorter than the others.

Apart from the other Figitidae, the subfamily Charipinae is specialized on attacking larvae of parasitic wasps in aphids (tribe Alloxystini) and psyllids (tribe Charipini) [Ronquist, 1999]. However, the karyotype of *Ph. villosa* generally resembles those of the other Figitidae (i.e. members of the subfamilies Figitinae and Eucoilinae) which also have $2n = 20$ or 22 with their biarmed chromosomes slightly decreasing in length [Crozier, 1975; Gokhman, 1999]. As far as other groups of the superfamily Cynipoidea are concerned, only members of the family Cynipidae have been studied karyologically (see [Gokhman, 2003] for review). Among more than twenty examined species of the Cynipidae, many of them have karyotypes containing acrocentric chromosomes, and in a few members of the family all chromosomes are acrocentric.



Fig. 1. Mitotic karyogram of *Phaenoglyphis villosa*. Scale bar 10 μ m.

Рис. 1. Митотические хромосомы *Phaenoglyphis villosa*. Масштаб 10 μ m.

ACKNOWLEDGEMENTS. The author is very grateful to N.S. Rak (Polar-Alpine Botanical Garden-Institute, Kirovsk, Russia) for providing living material as well as to O.V. Kovalev (Zoological Institute, St. Petersburg, Russia) for checking the identification of *Ph. villosa*.

References

- Crozier R.H. 1975. Animal cytogenetics. Vol.3. Pt.7. Berlin-Stuttgart: Gebrüder Borntraeger. 95 pp.
- Gauld I.D. & Bolton B. 1988. The Hymenoptera. Oxford: British Museum (Natural History). Oxford University Press. 332 pp.
- Gokhman V.E. 1999. [Chromosomes of *Callaspidia defonscolombeii* (Hymenoptera, Figitidae)] // Zool. Zhurn. Vol.78. No.12. P.1476–1477 [in Russian].
- Gokhman V.E. 2003. Karyotypes of parasitic Hymenoptera: evolution, systematic and phylogenetic implications. Unpublished D.Sc. thesis. Moscow: Moscow State University. 338 pp [in Russian].
- Imai H.T., Crozier R.H. & Taylor R.W. 1977. Karyotype evolution in Australian ants // *Chromosoma*. Vol.59. P.341–393.
- Imai H.T., Taylor R.W., Crosland M.W.J. & Crozier R.H. 1988. Modes of spontaneous chromosomal mutation and karyotype evolution in ants with reference to the minimum interaction hypothesis // *Japan. J. Genet.* Vol.63. P.159–185.
- Levan A., Fredga K. & Sandberg A.A. 1964. Nomenclature for centromeric position on chromosomes // *Hereditas*. Vol.52. P.201–220.
- Ronquist F. 1999. Phylogeny, classification and evolution of the Cynipoidea // *Zool. Scripta*. Vol.28. P.139–164.