

NOTA BREVE - SHORT NOTE

A NEW MULTIDISCUS ? SPECIES (FORAMINIFERA)
FROM A FUSULINACEAN-RICH SUCCESSION ENCOMPASSING
THE CARBONIFEROUS-PERMIAN BOUNDARY IN THE HADIM NAPPE
(CENTRAL TAURUS, TURKEY)

CENGİZ OKUYUCU

Received November 11, 1998; accepted June 30, 1999

Key-words: *Multidiscus* ?, Fusulinacean, Carboniferous-Permian Boundary, Biostratigraphy, Hadim Nappe, Turkey.

Riassunto. In questo articolo vengono studiati gli strati ricchi in fusulinidi intorno al limite Carbonifero-Permiano, provenienti dalla sezione di Çatalkatran Tepe, falda di Hadim, nei Tauridi centrali. La comparsa di *Sphaeroschwagerina* sp. viene utilizzata per definire il limite Carbonifero/Permiano in questa sezione. La presenza di *Pseudofusulina* ? *buzulukensis* Dobrokhotova, *Pseudofusulina parviflucta* Zhou, *Pseudofusulina hovumensis* Davydov, *Occidentoschwagerina* (?) *kosvaensis* Echlakov e di *Rugosofusulina stabilis* Rauzer-Chernousova conferma l'età Asseliana della parte superiore della sezione.

Abstract. The Hadim Nappe Carboniferous-Permian boundary and its fusulinacean-rich strata from the Çatalkatran Tepe stratigraphic section were studied.

The appearance of *Sphaeroschwagerina* sp. determines the Carboniferous-Permian boundary in this section. The presence of *Pseudofusulina* ? *buzulukensis* Dobrokhotova, *Pseudofusulina parviflucta* Zhou, *Pseudofusulina hovumensis* Davydov, *Occidentoschwagerina* (?) *kosvaensis* Echlakov and *Rugosofusulina stabilis* Rauzer-Chernousova confirm the Asselian age.

A new *Multidiscus* ? species, *Multidiscus* ? *tauridiana* n. sp. was discovered from the Early Permian (Asselian) of Turkey (Hadim Nappe, Central Taurus).

Introduction.

The study area is located in the southwestern part of Sariveliler (Karaman) in the Central Taurus region (Fig. 1). This area belongs to the Hadim Nappe that was described as an allochthonous tectonic unit to the south of Hadim by Blumenthal (1944, 1951). Güvenç (1965, 1969, 1974) studied different sections extensively and described a rich microfauna and microflora of Visean, Bashkirian, Moscovian, Kasimovian, Gzhelian, and Early and Late Permian deposits. Subsequently, Özgül (1976, 1984) studied the structural geology of the Hadim

Nappe. The last biostratigraphic studies of this region were carried out by Göktepe (1996), Okuyucu (1997), and Okuyucu and Güvenç (1997).

The Carboniferous-Permian boundary (C-P boundary) of the Hadim Nappe is represented mainly by quartzitic sandstones with iron oxide concretions and a very shallow marine limestone with very special facies known as *Girvanella* limestone (Güvenç, 1991). The *Pseudoschwagerina* zone of the Asselian is represented by the *Girvanella* limestone (Güvenç, 1965, 1977 b), composed of algae, fusulinids and fragments of fossils (brachiopods, echinoids, ostracods etc.).

The C-P boundary beds that are rich in fusulinaceans were investigated and a new *Multidiscus* ? species, *Multidiscus* ? *tauridiana* n. sp. was described from Early Permian deposits of the Çatalkatran Tepe stratigraphic section.

Stratigraphy.

The Hadim Nappe contains carbonate and clastic deposits from the Late Devonian to Late Cretaceous. The Late Carboniferous and Early Permian strata include a well-known *Girvanella* limestone facies (Fig. 1).

Güvenç (1977 b, 1980) examined the different sections of the Hadim Nappe and divided the Late Carboniferous and Early Permian strata into two formations, Gavuralani and Dikmentepe, respectively (Fig. 1). Only the lower levels of the Gavurala Formation were investigated. The levels studied begin with red, more or less sandy limestones. The upper levels are rich in iron oxide and characterized by *Girvanella* limestone. The Upper Carboniferous age is indicated by the existence of *Girvanella* sp., *Globivalvulina kamensis* Reitlinger,

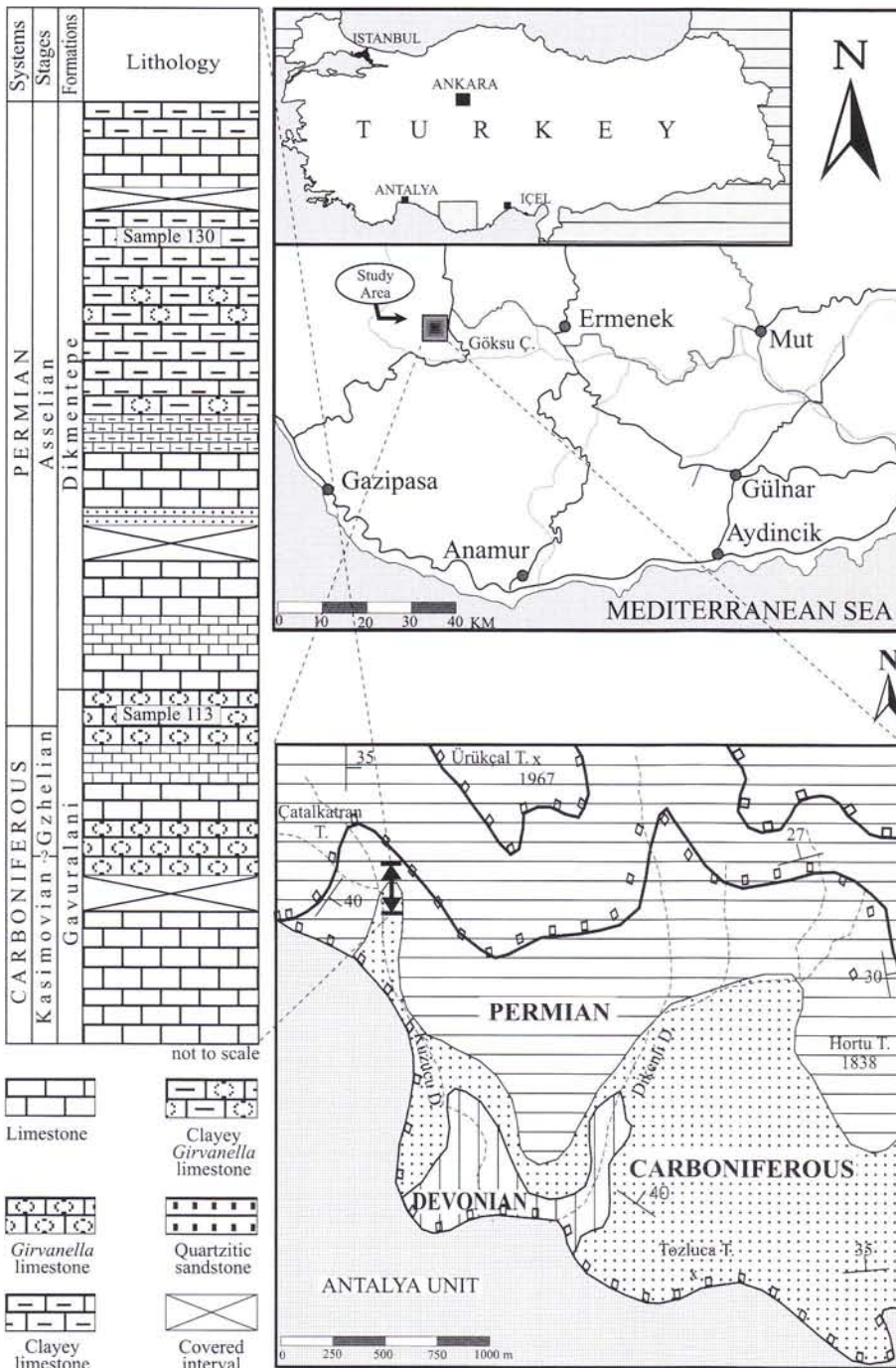


Fig. 1 - Location and geological map of the study area and Çatalkatran Tepe stratigraphic section.

Globivalvulina sp. A, and *Ammovertella* sp. (Plate 2).

Biostratigraphy.

Ruzhentsev (1950) developed a scheme for the C-P boundary interval utilizing ammonoid evolutionary stages and established four successive stratigraphic units. Later, Ruzhentsev (1952) correlated these stages with fusulinid data from Rauzer-Chernousova and Rozovskaya. In 1954, Ruzhentsev placed the lower boundary of the Permian system at the base of the Asselian stage and accepted the *Sphaeroschwagerina vulgaris*-*Sphaeroschwagerina fusiformis* zone as the base of the Asselian (Bogoslovskaya et al., 1995). The recently accepted definition of the C-P boundary at Aidaralash Creek (Davydov et al., 1995) approximates the horizon proposed by Ruzhentsev (1952). Chuvashov et al. (1986, 1990, 1993) also accepted Ruzhentsev's definition (the base of Asselian begins with the first appearance of *Sphaeroschwagerina* genus). In this study, the author accepts Ruzhentsev's (1954) Asselian definition (Fig. 2).

Güvenç (1965) determined the Kasimovian stage of the Upper Carboniferous based on the presence of *Quasifusulinoides* sp., *Schubertella* sp., *Fusiella* sp., *Pseudofusulina* sp., and the Gzhelian stage by the presence of *Daixina* sp., *Pseudofusulina* sp. and *Schubertella* sp. Güvenç (1965) suggested that the conglomerate and sandstone beds represent the upper part of the Gzhelian, and the Asselian may be marked by an unconformity. Later, Güvenç (1965, 1977 b) defined the Girvanella limestone as Asselian or equivalent to the *Pseudoschwagerina* horizon in the Göksu valley section.

In this study, fossils of Gzhelian age are represented by *Girvanella* sp., *Epimastopora* sp., *Garwoodia* sp., *Eotuberitina reitlingerae* Miklukho-Macklay, *Tetrata-*

Tetrataxis minuta Morozova, *Neotuberitina maljavkini* Mikhailov, *Quasifusulina* sp., *Ozawainella* sp., *Schubertella obscura* (Lee & Chen), and *Schubertella obscura procera* Rauzer-Chernousova (Plate 2).

The lower levels of the Dikmentepe Formation characterized by the *Girvanella* limestone and a red limestone were studied. The Asselian age is demonstrated by the presence of *Sphaeroschwagerina* sp., *Occidentoschwagerina* (?) *kosvaensis* Echlakov, *Pseudofusulina* ? *buzulukensis* Dobrokhotova, *Pseudofusulina hovunensis* Davydov, *Rugosofusulina stabilis* Rauzer-Chernousova, *Rugosofusulina stabilis longa* Rauzer-Chernousova, *Triticites* aff. *parvus* Chen, *Hemigordius* sp., *Multidiscus* ? *tauridiana* n. sp., *Tetrataxis parviconica* Lee & Chen,

Comparison: The type of coiling of the tubular chamber in the initial whorls, the enlargement and evolute coiling of the last chamber are the main characteristics of *Multidiscus ? tauridiana* n. sp. It can be easily distinguished from many *Hemigordius* species based on these features.

Multidiscus ? tauridiana n. sp. shows close similarity with the *Multidiscus padangensis* group in the planispiral coiling of the tubular chamber in the initial whorls and general shape of the test, but differs in the planispiral evolute last whorl which is the main distinguishing characteristic of *Multidiscus ? tauridiana* n. sp.

The general outline of the test of this form closely resembles *Hemigordius guvenci* Altiner from the Late Permian (Djulfian) of Taurus (Turkey). *Multidiscus ? tauridiana* n. sp. shows a planispiral coiling from the initial whorls to the last stage of the test (sometimes the outer

two or three whorls are deflected at a small angle). In *Hemigordius guvenci* Altiner, there is an important deflection in the initial whorls of the test. The former is also distinguished from the latter by having larger dimensions, less convex lateral surfaces, a wider last whorl and a smaller W/D (ratio of width to diameter; the present form has a W/D of 0.41-0.43:1 compared to 0.48-0.58:1 for *Hemigordius guvenci* Altiner).

Hemigordius longus Grozdilova appears similar to *Multidiscus ? tauridiana* n. sp. and has an involute and laterally compressed test. The tubular chamber is coiled in one plane and exhibits a slight deflection in the early whorls. On the other hand, coiling in *Multidiscus ? tauridiana* n. sp. is planispiral involute in the early whorls and the last whorl is coiled evolute. Although the initial chamber of *Hemigordius longus* Grozdilova is larger than in *Multidiscus ? tauridiana* n. sp., the other dimensions are smaller.

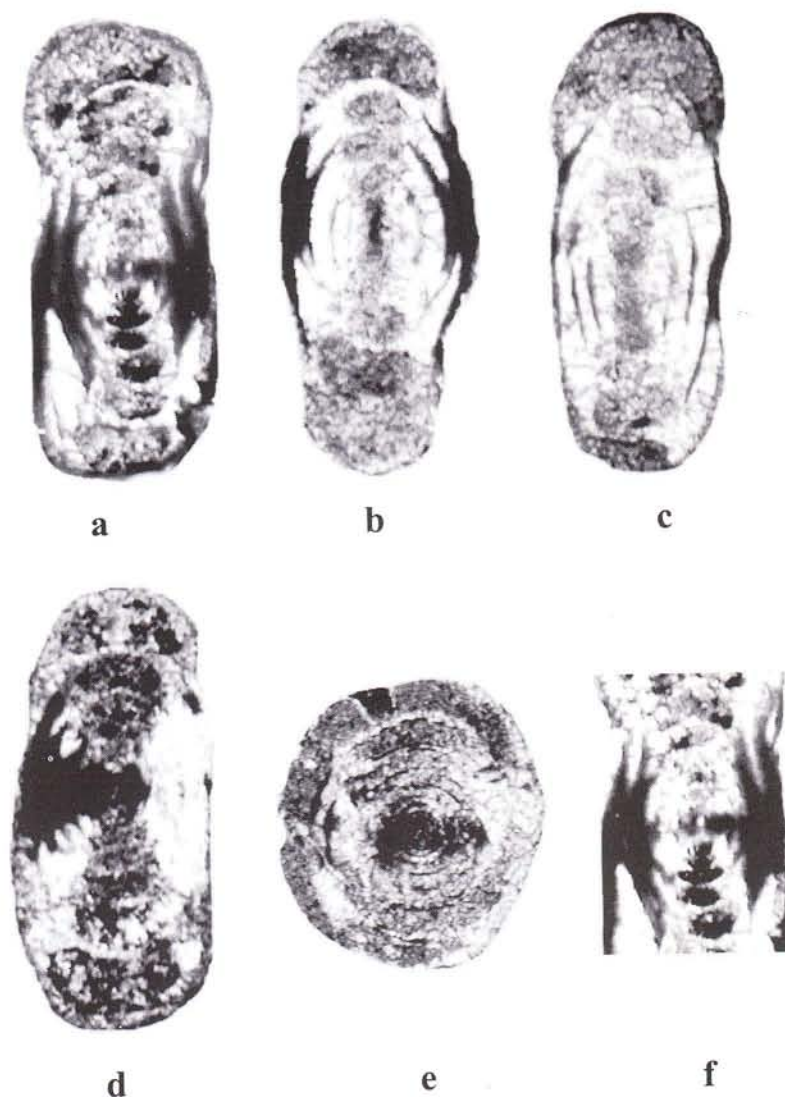


PLATE 1

Multidiscus ? tauridiana n. sp., Holotype; a - axial section, (130-3), x75, Paratypes; b - nearly axial section (130-5), x 82, c - subaxial section (130-5), x 78, d - axial section (130-6), x 86, e - subequatorial section (130-6), x 65, enlargement of last whorl seen clearly, f - detail of holotype, (130-3), x 80, planispiral coiling of tubular chamber in initial whorls and beginning of slight deflection in last whorls. Original photos were taken as *.cdr file directly by photo-microscope and plates were made by computer.

Hemigordius ovatus Grozdilova is one of the species similar to *Multidiscus* ? *tauridiana* n. sp. and it can be distinguished by having a streptospiral coiling (instead of planispiral) in the initial whorls, and larger total dimensions.

Remarks. *Multidiscus* ? *tauridiana* n. sp. is assigned tentatively to the genus *Multidiscus* due to the planispiral evolute coiled last whorl. However, other features, i.e. planispiral involute coiled inner part, porcelaneous wall and general shape of the test, display a close similarity to this genus.

Occurrence and Age. Çatalkatran Tepe region, Hadim Nappe (Göktepe-Karaman, Turkey), sample 130, Early Permian, Asselian.

Conclusion.

Late Carboniferous and Early Permian deposits in the Çatalkatran Tepe stratigraphic section of the Hadim Nappe were studied. *Multidiscus* ? *tauridiana* n. sp. was discovered and described.

Acknowledgements.

I am greatly indebted to Prof. Dr. Demir Altiner (M.E.T.U.) and Dr. Daniel Vachard (Lille) for their constant support, helpful advice, and discussions. I thank Prof. E. Leven (Moscow) for reviewing an earlier version of the paper, Prof. Dr. Tuncer Güvenç (Hacettepe University), Kagan Tekin (M.T.A.) and Kemal Erdoan (M.T.A.) for helpful advice. I wish to thank also T. Sükrü Yurtsever (M.T.A.) who assisted me while preparing the drawings.

REFERENCES

- Altiner D. (1978) - Trois nouvelles espèces du genre *Hemigordius* (Foraminifère) du Permien supérieur de Turquie (Taurus oriental). *Notes Lab. Paléont. Univ. Genève*, Fascicule 2, n. 5, 27-31, Genève.
- Blumenthal M. M. (1944) - Bozkir güneyinde Toros sıradaglarının serisi ve yapısı. *Ö.Ü.F.F. Mec.*, Seri B, 9, n. 2, 95-125.
- Blumenthal M. M. (1951) - Bati Toroslar'da Alanya Ard Ülkesinde jeolojik araştırmalar. *Maden Tetkik ve Arama Enst.*, Seri D, 5, 1-134.
- Bogoslovskaya M. F., Leonova T. B. & Shkolin A. A. (1995) - The Carboniferous-Permian boundary and ammonoids

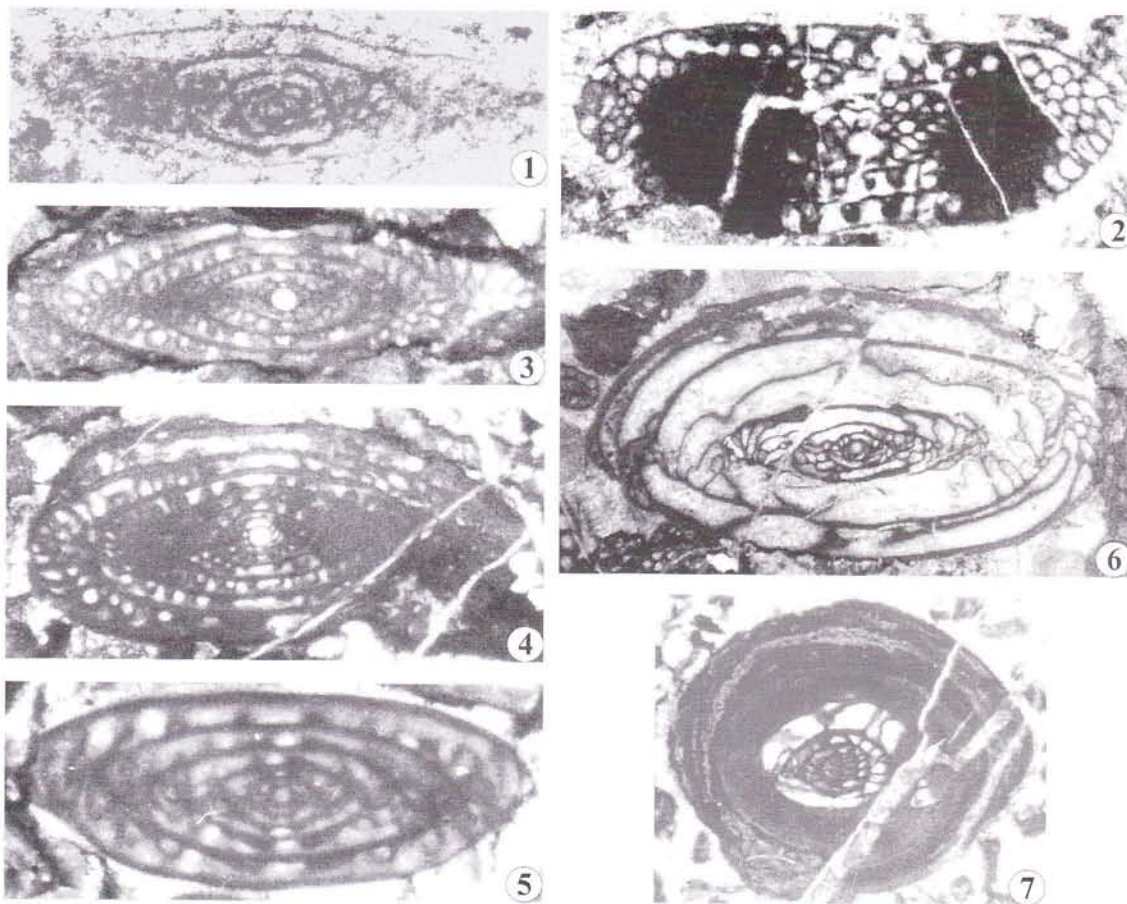


PLATE 2

Boultonia willsi SEE, axial section (110-1) x 70, 2 - *Quasifusulina* sp. A, axial section (111-2) x 20, 3 - *Pseudofusulina* ? *buzulukensis* Dobrokhovtova, axial section (121-5) x 17, 4 - *Rugosofusulina stabilis* Rauzer-Chernousova, axial section (119-15) x 18, 5 - *Triticites* aff. *parvus* Chen, axial section (118-23a) x 38, 6 - *Occidentoschwagerina* (?) *kosvaensis* Echlakov, axial section (117-1) x 13, 7 - *Sphaeroschwagerina* sp. nearly axial section (113-2) x 8. Original photos were taken as *.cdr file directly by photo-microscope and plates were made by computer.

- from the Aidaralash section, Southern Urals. *J. Paleont.* 69, n. 2, 288-301.
- Chuvashov B. I., Leven E. J. & Davydov V. I. (1986) - Border and surrounded fragments of sedimentary rocks of Carboniferous and Permian, Ural, Preural and Middle Asia, Biostratigraphy and Correlation (in Russian). *Publishing House "Nauka"*, Moscow, 1-157.
- Chuvashov B. I., Chernykh V. V., Mizens G. A. & Dyupina G. V. (1990) - Base type section of Upper Carboniferous and Lower Permian of western slope of Ural and Preural (in Russian). *Akad. Nauk S.S.S.R.*, 1-368, Sverdlovsk.
- Chuvashov B. I., Chernykh V. V. & Mizens G. A. (1993) - Zonal subdivision of the boundary deposits of the Carboniferous and Permian in the section of different facies in the South Urals. *Permophiles* 22, 11-16.
- Davydov V. I. (1993) - The Carboniferous-Permian boundary in Russia and its position in the Aidaralash type-section of the Urals. *Permophiles* 23, 5-8.
- Davydov V. I., Glenister B. F., Spinosa C., Ritter S. M., Chernykh V. V., Wardlaw B. R. & Synder V. S. (1995) - Proposal of Aidaralash as GSSP for base of the Permian System. *Permophiles* 26, 1-8.
- Goktepe G., (1996) - Anadolu Platformu'nda (Hadim Napi) Permiyen-Triyas Biyostratigrafisi ve Mikropaleontolojisi: *H. Ü. Fen Bil. Ens., Yüksek Mühendislik Tezi*, Ankara.
- Grodzilova L. P. (1956) - Miliolidae of the upper Artinskian of the western slope of the Urals (Russian). *VNIGRI, Microfauna of the U.R.S.S.*, Trudy, n. s., 5, sbornik 8, 524-526, Leningrad.
- Güvenç T. (1965) - Etude stratigraphique et micropaléontologique du Carbonifère et du Permian de Taurus Occidentaux dans l'arrière-pays d'Alanya (Turquie). *These Univ. Paris*.
- Güvenç T. (1969) - Western Taurus (Göksu Valley, Gazipasa, and Bademli-Cevizli Regions). *Unpublished M. T. A. Report*, Ankara, 1-18.
- Güvenç T. (1974) - Répartition stratigraphique des algues calcaires du Carbonifère et du Permien de la Téthys. *7th Cong. Int. Strat. Geol. Carb.* (Krefeld, 1971), 141-159.
- Güvenç T. (1977 b) - Stratigraphie du Carbonifère et du Permien de la Nappe de Hadim. *6th Colloq. Geology of Aegean Regions*, Aegean Univ., 251-261, Izmir.
- Güvenç T. (1980) - Alanya-Gazipasa Bölgesinin jeolojisi ve kiyiseridi deniz tabaniyla yapısal ilişkileri: *Ege Univ. Deniz Bil. ve Teknolojisi Inst.*, 139 p. Izmir.
- Güvenç T. (1991) - The paleogeography of Anatolia during the Permian and Triassic. *Int. Cong. on Perm. Sys. of the World*, Perm, Russia, Part III, ESRI Occasional Publications, 11B, 11-40.
- Loeblich A. R. J. & Tappan H. (1988) - Foraminiferal Genera and Their Classification. *Van Nostrand Reinhold*, 970 p., 845 pls., New York.
- Okuyucu C. (1997) - Hadim Napi Permiyen-Karbonifer Geçisi Biyostratigrafisi. *H. Ü. Fen Bil. Ens., Yüksek Mühendislik Tezi*. Ankara.
- Okuyucu C. & Güvenç T. (1997) - Hadim Napi Karbonifer-Permiyen Geçisi, Girvanella Kireçtası Olusum Paleontolojisi: *Yerbilimleri*, No. 30, s. 463-473, Adana.
- Özgül N. (1976) - Some geological aspects of the Taurus orogenic belt-Turkey: *Bull. Geol. Soc. Turkey*, 19, 65-78.
- Özgül N. (1984) - Stratigraphy and tectonic evolution of the Central Taurides. *Symposium on the Geology of the Taurus Belt*, 77-90, Ankara.
- Ruzentshev V. E. (1950) - Upper Carboniferous ammonoids of the Urals. *Transactions of Paleontology Institute* (in Russian) 29, 1-223.
- Ruzentshev V. E. (1952) - Biostratigraphy of the Sakmarian Stage in the Aktyubinsk Region, Kazakh SSR. *Transactions of Paleontological Institute, Academy Science of USSR*, v. 42, 90 p. (in Russian).
- Ruzentshev V. E. (1954) - Asselian stage of the Permian system. *Report, Ac. Sci. of USSR*, 99/6, 1079-1082.