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A New Pontîan Genus and Subgenus Discovery of Candonidae (Ostracoda) from the Eastern Black Sea Region of Turkey

Türkiye'nin Doğu Karadeniz Bölgesi'nden Candoniade (Ostracoda) familyasına ait Ponsiyen Yaşlı Bir Yeni Cins ve Altcinsin Keşfi

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Abstract

In this paper, one new genus *{Anatolia)* and subgenus *(Trabzonella)* of Candonidae family are suggested and represented from the Araklı section (Trabzon). Both genus and subgenus and their species *{Anatolia pontica, Trabzonella turcica)* have been found in the thin unconsolidated sandstone horizon which has yellow and abundunt shelly fragments with rich and abundance ostracoda as^Bations. They are Pontian aged and characteristics of oligohaline environment.

Key word: Ostracoda, *Candonidae,* Pontian, New genus and subgenus, Paratethys, Turkey.

Öz

Bu çalışmada, Araklı (Trabzon) yöresinde keşfedilmiş Candonidae familyasına ait yeni bir cins (Anatolia) ile yeni bir altcins (Trabzonelle) önerilmiş ve tanımlanmıştır. Her iki yeni taxon ve onlara ait türler (Anatolia pontica ve Trabzonella turcica) sarı renkli, bol kavkı kırıkları ve zengin bir ostrakod topluluğu içeren, pekişmemiş kumlu seviyelerde saptanmıştır. Bu seviyeler Ponsiyen yaşlı olup, acısu ortam koşullarında çökelmiştir.

Anahtar kelimeler: *Ostracoda, Candonidae, Ponsiyen, Yeni cins ve altcins, Paratetis, Türkiye.*

INTRODUCTION

First detailed investigation on the Candonidae family was realized by Freels, 1980 in the some localities of Turkey's Neogene units. Other important investigations about this subject are Gökçen, 1979, Tunoğlu, 1984, Tunoğlu and Gökçen, 1985, 1991, 1997 ; Tunoğlu and Çelik, 1995, Tunoğlu et al., 1995, 1996, Tunoğlu and Bayhan, 1996, Tanar, 1989 and Tunoğlu et al., 1998, Tunoğlu and Ünal, 2001, Tunoğlu, 2001. Other some important investigations from the outside of Turkey on the Candonidae family are Agalarova, 1967; Krstic, 1969, 1975, 1979; Stancheva, 1981, 1989; Rundic, 1990 and Meisch, 2000.

The present study is based on the analyses of the ostracoda fauna associations obtained from 61 outcrop samples from Araklı Section /Trabzon and east of Değirmendere Section/Trabzon (Figure 1), which is located in the northeast part of Anatolia along the Black Sea coast. The study area was southern border of Euxinic basin of Paratethys during the Pontian stages.

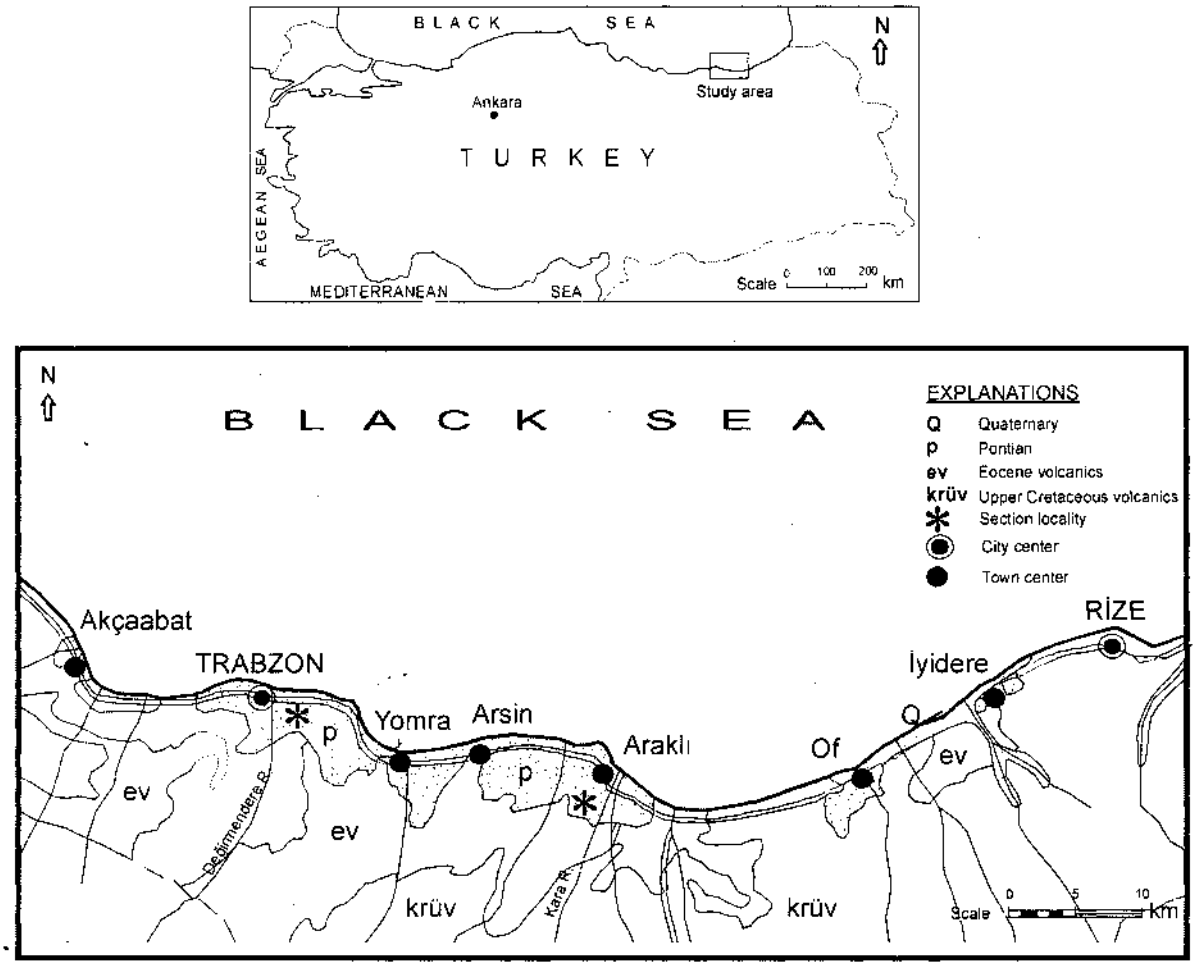


Figure 1. Location and geological map, and sections localities of investigation area (Geologic map simplified after the 1/500000 scaled Geological map of Turkey).

Şekil 1. *Çalışma bölgesinin yerbulduru haritası, jeolojik haritası ve ölçülü stratigrafi kesit noktaları (Jeolojik harita 1/500000 ölçekli Türkiye Jeoloji Haritası'ndan basitleştirilerek alınmıştır).*

This is the first ostracoda data about this area (Tunoğlu et al., 1998). First detailed ostracoda investigation has been realized by Tunoğlu, 1984, Tunoğlu and Gökçen, 1985, 1991, 1995 and 1997 in the Sinop Peninsula. This paper is a part of a detail investigation, which is completed being TÜBİTAK project.

GEOLOGIC SETTING

The study area is located in a portion of the east part of the Pontid Tectonic Unit (Ketin, 1966). These area is covered with very complex and dominant magmatic and volcano-sedimentary belts during upper Cretaceous and Eocene periods which is related to plate tectonic conditions. Pontian sedimentary units are located on the Eocene aged volcanic and volcanoclastic material by unconformably.

Neogen aged units are observed in İğneada (near Bulgaria border), Sinop Peninsula, Bafra, Çarşamba (Samsun), Akçaabat, Araklı and Trabzon district along the Black Sea coast from west to east. These are very restricted and isolated sedimentary basins, which are related with Paratethys along the Black Sea coast of Turkey from Bulgaria to Georgia border. One of them is Sinop Basin which is located centre of northern Anatolia coast has covered wide sequare and very thick stratigraphic column than the others.

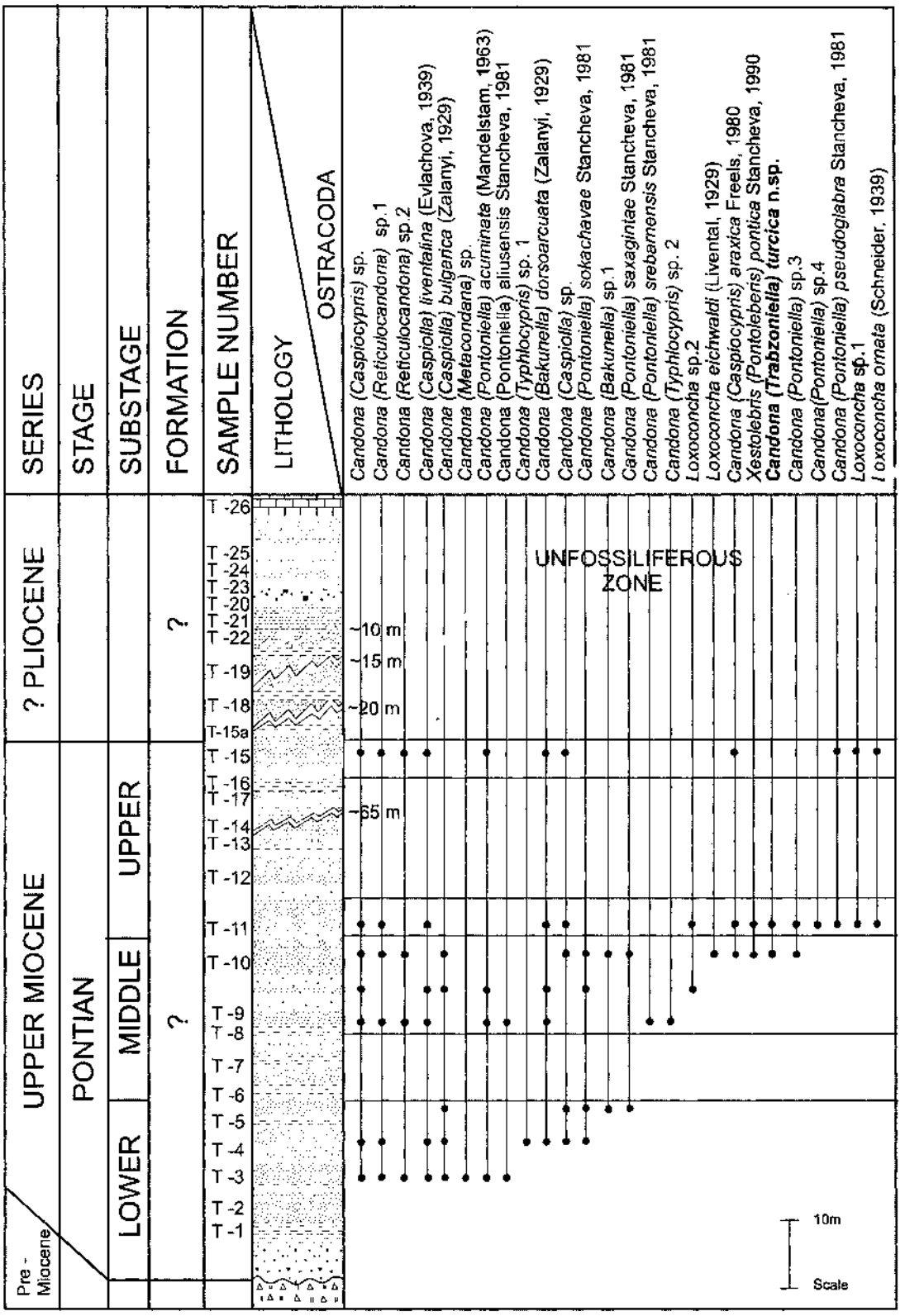
Stratigraphic distribution of new genus *(Anatolia)* and subgenus *(Trabzonella)* of Candonidae Family and the other ostracoda assemblages in the Araklı and east of Değirmendere Sections (Trabzon) has been given in Table 1 and Table 2.

Table 1. Stratigraphic distribution of new genus *(Anatolia)* and subgenus *(Trabzonella)* of Candonidae Family and the other ostracoda assemblage in the Araklı Section (Araklı/Trabzon).
Çizelge 1. Araklı Kesiti 'nde (Araklı/Trabzon) yeni cins (Anatolia) ve yeni altcinsin (Trabzonella), diğer ostrakod topluluğu ile birlikte stratigrafik dağılımı.

FAMILY	SUBFAMILY	GENUS	SUBGENUS	FEATURES					Environment	Age
				OUTER FEATURES		INNER FEATURES				
				Gen. Shape of valve	Valve surf. features	Hinge	Marginal Zone	Muscle Scar		
CANDONIDAE KAUFMANN, 1900	CANDONINAE KAUFMANN, 1900	Candona BAIRD, 1845	*Candona* BAIRD, 1845	l.v. bean shape m.h. at the center or posterior m.k. at the v.m.	smooth, and transparent weakly reticulated		m.z. narrow v. broadly at the anterior m.p.c. numerous straight, simple and short		Generally Fresh Water	[PEOCENE]-OLIGOCENE RECENT
			Bakunella SCHNEIDER, 1968	l.v. trapezoidal a.m. rounded v.m. concave d.m. straight p.m. diagonal	smooth, and reticulated		interior lamella very vide four times than the concression zone		Fresh Water	PLIOCENE-PLEISTOCENE
			Caspiocypris MENDELSTAM, 1956	l.v. trapezoidal p-v. m. tapering d.v. ovate d.m. straight	smooth or slightly pited or reticulated n.p.c. abundant and small. Eye tubereule absent		like a Condona		Fresh Water	PLIOCENE-RECENT
			Caspolla MENDELSTAM, 1956	l.v. kidney shaped a.m. rounded p.m. long & tapering d.m. straight or convex v.m. straight or sinous	smooth, and transparent rare reticulated		m.z. narrow m.p.c. numerous and dense		Fresh Water	PLIOCENE-PLEISTOCENE
			Pseudocandona BRONSTEIN, 1947	l.v. kidney shaped d.m. strongly convex v.m. strongly concave	smooth, bright and transparent		m.z. narrow v. vide m.p.c. numerous short, simple and straight sometimes bifurcate		Brackish Fresh Water	?-PLEISTOCENE
			Typhlocypris VEJDOVSKY, 1882	l.v. triangular d.v. strongly convex v.m. concave	smooth and bright		m.z. narrow v. vide m.p.c. numerous short, simple sometimes bifurcate		Fresh Water	PLIOCENE-RECENT
			Linocypris ZALANYI 1936	l.v. trapezoidal v.m. long and slightly concave d.m. straight d.v. ovate	smooth sometimes pits and reticulated		m.z. and m.p.c. are genus character		Fresh Water Gen. deep Lake	PALEOCENE-PLIOCENE
			Pontocella MANDELSTAM, 1956	l.v. bean shaped a.m. well rounded p.m. tapering and long	smooth and pited		m.z. narrow m.p.c. straight, dense at the anterior margin		Fresh Water	?-PLIOCENE-RECENT
			Trabzonella Tunoğlu, 2002	l.v. trapezoidal d.m. straight a.m. well rounded v.m. concave p.m. oblique	smooth and bright		m.z. narrow m.p.c. straight, dense, short and thin		Brackish	MIDDLE LATE PONTIAN
			Anatolia Tunoğlu, 2002	l.v. trapezoidal d.m. convex a.m. well rounded v.m. concave p.m. oblique	smooth, bright and transparent		m.z. narrow m.p.c. straight. dense, short and thin		Brackish	MIDDLE LATE PONTIAN

abbreviations: a.m. anterior margin / d.m. dorsal margin / l.v. lateral view / n.p.c. normal pore canals / v. vestibule / m.z. marginal zone p.m. posterior margin / v.m. ventral margin / d.v. dorsal view / m.p.c. marginal pore canals / h. hinge

Table 2. Stratigraphic distribution of new subgenus Trabzonella of Candonidae Family and the other ostracoda assemblage in the east of Değirmendere Section (Trabzon).
Çizelge 2. *Değirmendere doğusu Kesiti 'nde (Trabzon) yeni alicimin (Trabzonella), diğer ostrakod topluluğu ile birlikte stratigrafik dağılımı.*



SYSTEMATIC DESCRIPTION

Two new Pontian aged Candonidae genus and subgenus were discovered and identified in the Araklı and east of Değirmendere Sections. Photographic (SEM) and hand drawing figures of them are given at Plate 1-2. Hartmann and Puri (1974) Classification has been used for the systematic description of the new genus and subgenus. Moore, 1961, Morkhoven 1962, 1963 and Catalogue of Ostracoda (Ellis and Messina, 1953-1985) have also been used for the determinations and comparations. All of the systematic and taxonomic descriptions are given below. Comparison table of some subgenera of Candonidae family are given in Table 3. The holotype and paratypes of the species are archived at the Geological Engineering Department of Hacettepe University.

Plate 1, 2. Photographic (SEM) and hand drawing figures plate of new genus *(Anatolia)* and subgenus *(Trabzonella)* of Candonidae family.

***Plate* i, 2.** *Candonidae familyasına ait yeni cins (Anatolia) ve yeni altcinsin (Trabzonella) fotoğrafik (SEM) ve el çizimi şekilleri.*

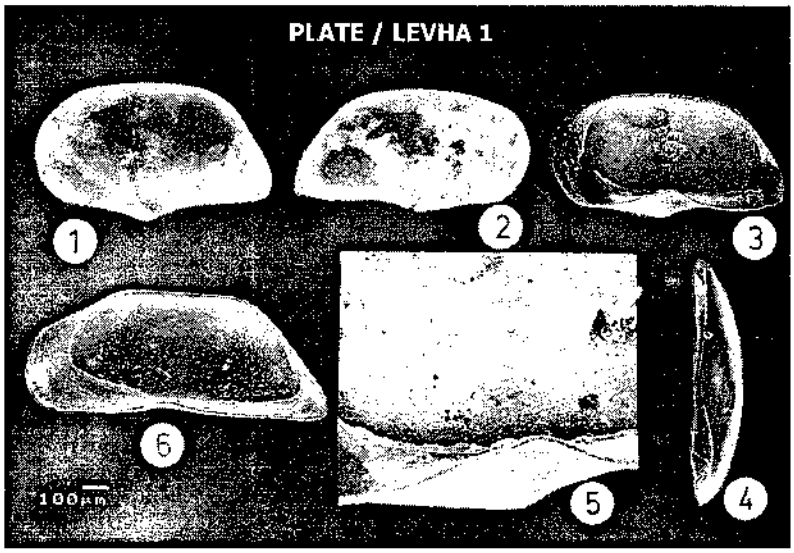


Figure 1-5. ***Anatolia pontica*** nov. gen. n.sp.
Araklı (Trabzon)/factory of brick-tile kilns,
sample number: Y-33, middle Pontian.
1. Left valve, external view. x50
2. Right valve, external view. x50
3. Right valve, internal view. x50
4. Left valve, ventral view. x50
5. Right valve, internal view,
muscle scars and ventral fold. x150

Figure 6. ***Candona (Trabzonella) turcica*** nov.subgen. n.sp.
Araklı (Trabzon)/ factory of brick-tile kilns,
sample number: Y- 31, middle-late Pontian.
Right valve, internal view. x50

Şekil 1-5. Anatolia pontica nov. gen. n.sp.
Araklı (Trabzon)/ tuğla-kiremit fabrikası,
örnek numarası: Y-33, orta-geç Ponsiyen.
1. Sol kapak, dış görünüm x50.
2. Sağ kapak, dış görünüm x50.
3. Sağ kapak, iç görünüm x50.
4. Sol kapak, karın görünümü x50.
5. Sağ kapak, iç görünüm, kas izi ve karın kıvrımı x150.

Şekil 6. ***Candona (Trabzonella) turcica*** nov.subgen. n.sp.
Araklı (Trabzon)/ tuğla-kiremit fabrikası,
örnek numarası: Y- 31, orta-geç Ponsiyen.
Sağ kapak, iç görünüm x50.

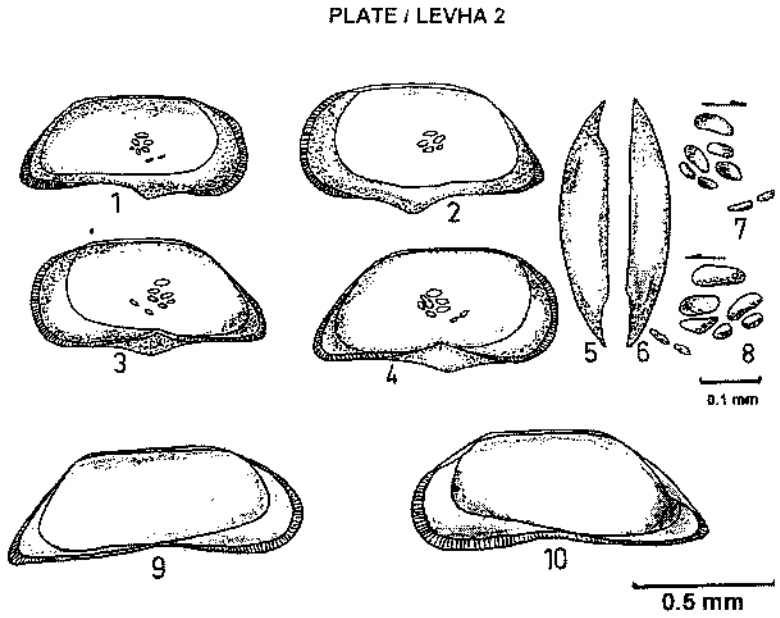


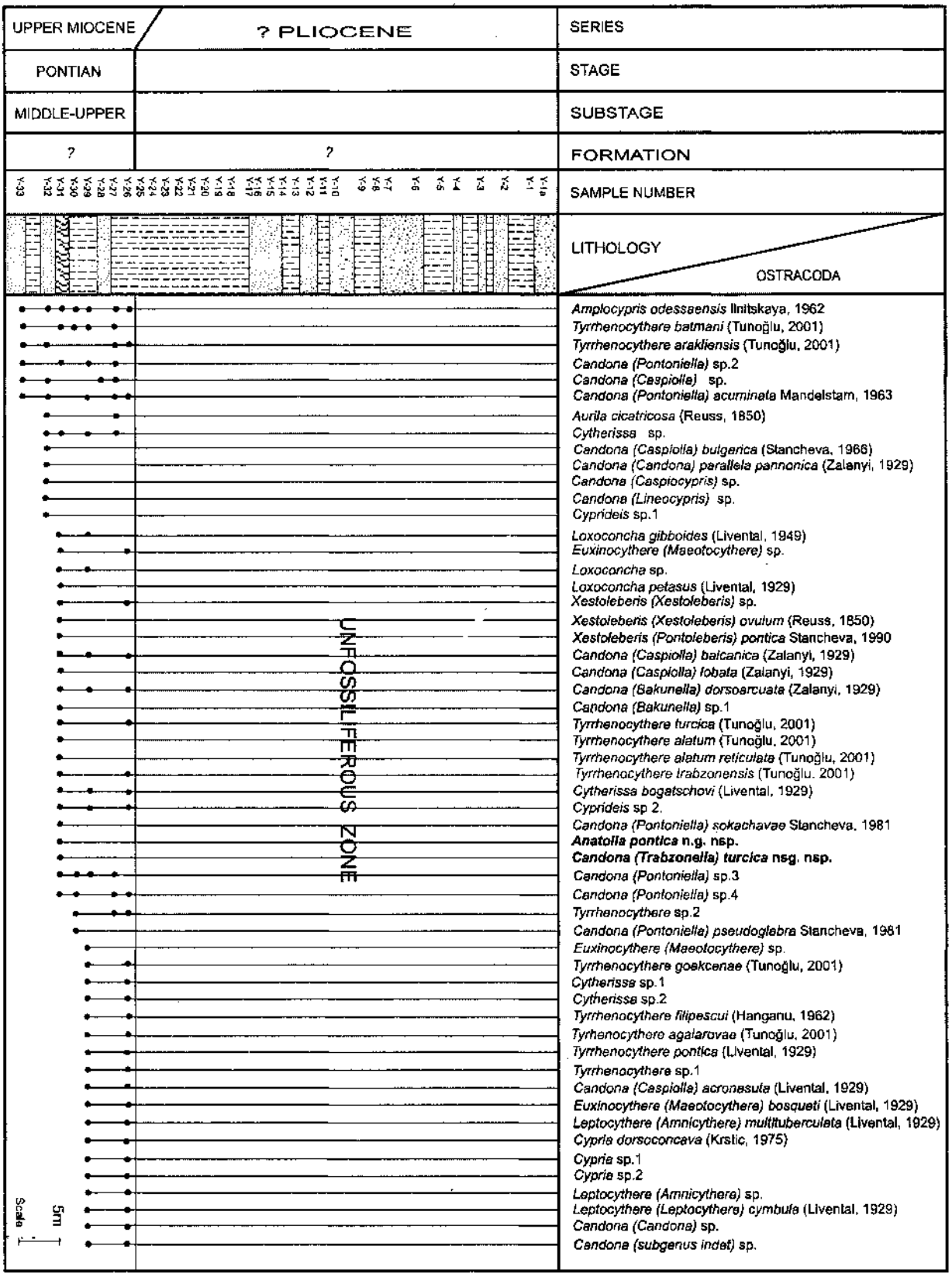
Figure 1-8. Anatolia pontica nov.gen. n.sp.
Araklı (Trabzon)/ factory of brick-tile kilns,
sample number: Y-33, middle-late Pontian.
1. Right valve, external view. x55
2. Right valve, external view. x55
3. Right valve, internal view. x55
4. Left valve, internal view. x55
5. Left valve, dorsal view. x55
6. Right valve, dorsal view. x55
7. Central muscle scars, left valve internal view. x170
8. Central muscle scars, right valve, internal view. x170

Figure 9,10. Candona (Trabzonella) turcica nov.subgen. n.sp.
Araklı (Trabzon)/ factory of brick-tile kilns,
sample number: Y-31, middle-late Pontian.
9. Right valve, internal view. x60
10. Left valve, internal view. x60

Şekil 1-8. *Anatolia pontica nov.gen. n.sp.*
Araklı (Trabzon)/ tuğla-kiremit fabrikası,
örnek numarası: Y-33, orta-geç Ponsiyen.
1. Sağ kapak, dış görünüm x55.
2. Sağ kapak, dış görünüm x55.
3. Sağ kapak, iç görünüm x55.
4. Sol kapak, iç görünüm x55.
5. Soi kapak, sırt görünümü x55.
6. Sağ kapak, sırt görünümü x55.
7. Merkezi kas izi, sol kapak iç görünüm x170.
8. Merkezi kas izi, sağ kapak iç görünüm x170.

Şekil 9, 10. Candona (Trabzonella) turcica nov.subgen. n.sp.
Araklı (Trabzon)/ tuğla-kiremit fabrikası,
örnek numarası: Y-31, orta-geç Ponsiyen.
9. Sağ kapak, iç görünüm x60.
10. Sol kapak, iç görünüm x60.

Table 3. Comparison of some subgenera of Candonidae family.
Çizelge 3. Candonidae familyasına ait bazı altcinslerin karşılaştırması.



Family: CANDONIDAE Kaufmann, 1900
Subfamily: CANDONINAE Kaufmann, 1900

Ecology: They live generally in fresh-water, but also live in oligohaline and mesohaline conditions. Life style is benthic (Morkhoven, J963).

Genus: *Anatolia* nov. gen.
Type-species: *Anatolia pontica* n.sp.

***Anatolia* nov. gen.**
pi. 1 figs. 1-5; pi. 2, figs. 1-8

Derivation of name: Anatolia (Peninsula between Asia and Europe, which Turkey is located on this land).

Espece-type: *Anatolia pontica.*

Description: Carapace is trapezoidal shape in lateral view. Dorsal margin is long and straight or slightly convex. Antero-dorsal and postero-dorsal corners are not angular. Posterior and ventral margins are not parallel to each other. Postero-ventral corner is tapering, Anterior margin is well rounded and not depressed to ventral margin, like the other genus of family. Ventral margin has characteristic peculiarity that is differentiated from the other genera of this family. There is a wide "V" shape projecting structure nearly central-ventral area of the valve. Reversibility, there is a wide "V" shape projecting structure in the same locality at the internal view of the valve. This valve structure may be very important in the living and moving position (vagrant style) for genera. Both end have equal tapering at the dorsal view, maximum length near the ventral margin, maximum height and width at the centre of the valve.

Hinge is adont, marginal zone is narrow, marginal pore canals are numerous, dense, straight, thin and simple. Vestibule is wide at the anterior margin, ventral margin and postero-ventral corner. It has six central muscle scars and two mandibular scars at the anterior. A largest central muscle scar is placed on the upper side of the centre of the valve and the other five scars more scattered and different shape and size than the other Candonidae genera. Sexual dimorphism is present, valve of male longer and little height, but valve of female has widther than the male valve.

Affinities: *Candona* ge.ius and its subgenera have generally like a flowers muscle scars (see-Table 3) but, muscle scars of *Anatolia* genus has untidy, the number of scars are five but, three of them are thin and longer, two of them small and rounded which is located below. Wide vestibule and projecting part of ventral margin are characteristics of this genus.

Locality and stratigraphic level in this study: Araklı (Trabzon), factory of brick-tile kilns, sample number: Y-31, Pontian.

***Anatolia pontica* nov. gen. n.sp.**
pl.1 figs.1-5 ; **pi.** 2 figs. 1-8

Derivation of name: Pontic Basin, Pontian stage, Pontids (The Northern Anatolian Tectonic Belt).

Holotype: Left valve.

Paratype: 2 carapaces, 14 valves.

Type-locality: Araklı (Trabzon), factory of brick-tile kilns.

Type-level: Pontian.

Diagnosis: Valve is trapezoidal in lateral view. Anterior margin is well rounded and repressed towards ventral margin, dorsal margin is slightly concave, posterior margin is diagonal and long towards ventral margin. Strong marginal part is an important peculiarity of this species. Surface of the valve is smooth, marginal zone is narrow but vestibule is wide along the anterior, ventral and posterior margins.

Description: Carapace is trapezoidal shape in the lateral view. Dorsal margin is slightly concave or straight. Antero-dorsal margin is not angular. Postero-dorsal corner is angular (140 degrees). Posterior margin is oblique, straight, long and tapering towards ventral margin. Ventral margin is characteristics of this genus, and broad V shaped marginal part is placed at the centre of the ventral margin. Valve surface is smooth and bright, ante-

rior and posterior end is tapering at the dorsal view. Maximum length is at the ventral margin, maximum height and width at the centre of the valve.

Marginal pore canals are thin, short and numerous. Vestibule are wide at the anterior and posterior ends. Hinge is adont. Central muscle scars are similar to Candonidae family. But, adductor muscle scars thiner and smaller than in the other *Candana* genera. There are two mandibule scars at the anterior. Sexual dimorphism is visible, male forms are longer and narrower than the female forms.

Dimensions: Length: 0.82-0.87 mm
Height: 0.45-0.51 mm
Width: 0.30-0.34 mm

Affinities: This specimen is generally similar to *Candona (Pontoniella)* genus by external view. Especially central muscle scars are different with the other Candonidae genera (see Table 3).

Locality and stratigraphic level in this study: Araklı (Trabzon), factory of brick-tile kilns, sample number: Y-31; Pontian

Subgenus: *Trabzonella* nov. subgen.

***Candona (Trabzonella)* nov. subgen.**
pi. 1 fig.6 ; **pi.** 2 figs. 9,10

Derivation of name: Trabzon (largest and historical city of Eastern Black Sea Coast of Turkey).

Type species: *Candona (Trabzonella) turcica*.

Description: Carapace is trapezoidal shape in lateral view. Dorsal margin is long and straight. Antero and postero-dorsal corners are angular (150 and 130 degree). Anterior margin is.repressed towards ventral margin and well rounded, posterior margin is oblique, straight and tapering towards ventral margin, ventral margin is concave at the centre, right valve has a characteristic sinuous margin at the internal view of posterior margin. This folding is covered to left valve at the external. Similar small fold structure is observed at the antero-dorsal margin. Valve surface is smooth and shiny, marginal pore canals, hinge and muscle scars are genus character. Vestibule is wide at the anterior and posterior.

Material: 2 carapaces, 15 valves

Dimensions: Length: 1.00-1.10 mm
Height: 0.45-0.48 mm
Width: 0.34-0.42 mm

Remarks: This subgenus is similar to *Candona (Pontoniella)* Mandelstam, but *Candona (Trabzonella)* subgenus differs in having a folding on the posterior margin and longer and tapering ventral margin and ventral margin is concave at the centre of margin (see Table 3).

Locality and stratigraphic level in this study: East of Değirmendere, T-10; Araklı (Trabzon), factory of brick-tile kilns, sample number: Y-28, Y-30, Y-31, Pontian.

***Candona (Trabzonella) turcica* n.sp.**

pl.1 fig. 6; pi. 2 figs. 9, 10

Derivation of name: Turkey, Turk

Holotype: Right valve.

Paratype: 1 carapace, 7 valves.

Type-locality: East of Değirmendere/Trabzon.

Type-level: Middle Pontian.

Diagnosis: Carapace is trapezoidal in the side view, dorsal margin is long and straight, anterior and posterior corners are angular. Postero-ventral comer is tapering. Ventral margin is concave. It has a characteristic fold in the internal view of posterior margin, valve surface is smooth and shiny.

Description: Valve is trapezoidal in lateral view. Dorsal margin is straight and long. Antero-dorsal and postero-dorsal comers are angular (150 and 130 degree). Anterior margin is repressed toward ventral margin and well rounded. Posterior margin is straight and diagonally toward posterior

margin, and has tapering and long at the postero-ventral area, ventral margin is concave. There is a characteristic fold in the internal view of the posterior margin. This fold is covered in the left valve from the external. Similar small fold is observed at the antero-dorsal area. Marginal pore canals, hinge and muscle scars are genus character. Vestibule is wide at the anterior and posterior margins.

Material: 2 carapaces, 15 valves

Dimensions: Length: 1.00-1.10 mm

Height: 0.45-0.48 mm

Width: 0.34-0.42 mm

Remarks: *Pontoniella acuminata* has a characteristic folding at the antero-dorsal corner, but our specimen has longer and tapering postero-ventral margin than *Pontoniella acuminata.* Ventral margin is concave at the centre. This species is very closely similar to *Candona (Pontoniella) pontica* Agalarova and C. *(Pontoniella) loczyi* (Zalanyi), but differs in having by folding on the posterior margin. *Candona (Pontoniella) acuminata sinistritruncata* Freels has characteristic tiny cotes along the valve surface and has not characteristic fold as *Candona (Trabzonella) turcica* at the posterior margin.

Locality and stratigraphic level in this study: East of Değirmendere, sample number: T-10; Araklı (Trabzon), factory of brick-tile kilns, sample number: Y-28, Y-30, Y-31, Pontian.

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GENİŞLETİLMİŞ ÖZET

Candonidae Kaufmann 1900 familyası ve onun alt familyası olan Candoninae Kaufmann, 1900 Türkiye Neojeni'nde en ayrıntılı olarak ilk kez Freels, 1980 tarafından ortaya konulmuştur. Gökçen, 1979, Tunoğlu, 1984, Tunoğlu and Gökçen, 1985, 1991, 1997; Tunoğlu and Çelik, 1995, Tunoğlu et al., 1995, 1996, Tunoğlu and Bayhan, 1996, Tanar, 1989 and Tunoğlu et al., 1998, Tunoğlu and Ünal, 2001 ve Tunoğlu, 2001 Türkiye'de bu konuda gerçekleştirilmiş önemli çalışmalardır. Ülkemiz dışında ise özellikle Agalarova, 1967; Krstic, 1969, 1975, 1979; Stancheva, 1981, 1989; Rundic, 1990 ve özellikle Meisch, 2000 başlıcalarıdır.

Bu çalışma, Araklı/Trabzon ilçesinde ve Trabzon Değirmendere doğusunda (Şekil 1) alınan iki ayrı kesite ait, 61 örneğin incelenmesi sonucu saptanan, Candonidae familyasına ait yeni bir cins ile yeni bir altcinsin ve bunlara ait iki yeni türün keşfi ve bunların bilimsel kamuoyuna önerilmesi ve tanımlanmasını içermektedir.

Çalışma bölgesi Pontidler Tektonik Birliği için-,de yeralmaktadır (Ketin, 1966). Bu bölge yoğun olarak Üst Kretase-Eosen yaşlı magmatik ve volkanosedimanter birimler ile örtülüdür. İnceleme konusu olan Ponsiyen yaşlı sedimantei birimler, bu eski birimleri uyumsuzlukla örtmektedir. Söz konusu yeni taxonlar bol kavkı kırıntıları içeren pekişmemeiş kumlu seviyelerle, killi seviyeler içinde zengin bir ostrakod fauna topluluğu ile birlikte bulunmuştur.

Anatolia cinsi ve *Trabzonella* altcinsi ve bunların tip türleri olan *Anatolia pontica* ile *Trabzonella turcica* ilk kez bu çalışmada sistematik olarak tanımlanmış ve **takdiri** edilmiştir. Bu iki yeni tür ile ait oldukları cins ve altcins Ponsiyen yaşını ve oligohalin (acısu) bir ortamı karakterize etmektedir.

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