Tarsonemidae of China

(Acari: Prostigmata)

An Annotated and Illustrated Catalogue and Bibliography

Systematic and Applied Acarology Special Publications 3

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Table of Contents

Acknowledgments 4
Abstract 5
Introduction 6
Catalogue 7
Abbreviations 7
Family Tarsonemidae Canestrini & Fanzago 8
  Subfamily Pseudotarsonemoidinae Lindquist 10
    Tribe Pseudotarsonemoidini Lindquist 10
      Genus Polyphagotarsonemus Beer & Nucifora 10
      Genus Pseudotarsonemoides Vitzthum 21
    Tribe Tarsonemellini Lindquist 21
      Genus Ficotarsonemus Ho 21
  Subfamily Acarapinae Schaarschmidt 22
    Tribe Acarapini Schaarschmidt 22
      Genus Acarapis Hirst 22
  Subfamily Tarsoneminae Canestrini & Fanzago 23
    Tribe Tarsonemini Canestrini & Fanzago 23
      Genus Daidalotarsonemus DeLeon 23
      Genus Fungitarsonemus Cromroy 25
      Genus Iponemus Lindquist 27
      Genus Neotarsonemoides Kaliszewski 27
      Genus Rhynchotarsonemus Beer 28
      Genus Tarsonemus Canestrini & Fanzago 28
      Genus Xenotarsonemus Beer 43
    Tribe Hemitarsonemini Lindquist 44
      Genus Hemitarsonemus Ewing 44
    Tribe Steneotarsonemini Lindquist 45
      Genus Dendroptus Kramer 45
      Genus Ogmotarsonemus Lindquist 45
      Genus Steneotarsonemus Beer 46
Undetermined tarsonemid species 56
References 57
Illustrations 75
Index to taxa 119
Acknowledgments

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Abstract

This catalogue provides information for 93 species belonging to 15 genera in three subfamilies of the Tarsonemidae known from China. For each taxon, the following information is provided (1) synonyms, (2) bibliographic information and (3) notes (in parenthesis) indicating the content of the papers cited. Illustrations are included for most species described from China in journals not commonly available in libraries outside China.

It is noted that Cheylotarsonemus minutus Tseng & Lo, 1980 is preoccupied by Lupotarsonemus minutus Attiah, 1970, both now placed in Tarsone- mus. Tarsonemus brevicorpus Lin nom. nov. is proposed as a replacement name for minutus Tseng & Lo.

Key words: Acari, Tarsonemidae, catalogue, illustrations, bibliography
Introduction

This catalogue aims to bring together in one book an index to published information (up to September 1998) about all species of tarsonemid mites known in China. This is the second in a series of books in English to make known to the English-speaking world the vast acarological literature published in Chinese. The first one was on eriophyoid mites (Hong & Zhang 1996).

This project was first initiated when Dr. Zhang visited Fujian in the summer of 1997. Dr. Zhang suggested to Mr. Lin the ideas of preparing this catalogue and they together outlined how it would be prepared. They then pooled their resources in terms of publications relating to Chinese Tarsonemidae and Mr. Lin keyed in the majority of the text. Dr. Zhang worked with Mr. Lin when he visited Fujian in September and October 1998, completing the first draft, which was brought to London to be revised, indexed and completed by Dr. Zhang for publication.

The catalogue is organized systematically by subfamilies and tribes. Genera within each tribe/subfamilies and species within each genus are listed alphabetically. Entries for each taxon include: (1) synonyms, (2) references including such bibliographic information as name(s) of the author(s), year of publication, journal title plus volume number and page number or book title, publisher and page number, and (3) notes (in parenthesis) indicating the content (type locality, hosts and distribution etc.) of the papers cited; references are listed chronologically within each entry.

Illustrations are provided for most species described from China in journals not commonly available in libraries outside China.

The catalogue and illustrations are followed by a full list of references arranged alphabetically by author.

This book includes 93 Chinese species belonging to 15 genera in three subfamilies of the Tarsonemidae. This accounts for about 18% of the 524 described species of the Tarsonemidae in the world.
Catalogue

Abbreviations

BMNH (The Natural History Museum, London, UK).
CNC (Canadian National Collection, Ottawa, Canada).
CNCIA (Canadian National of Insects and Arachnids, Ottawa, Canada).
DAZTARI (Department of Applied Zoology, Taiwan Agricultural Research Institute, Wufeng, Taichung, Taiwan, China).
DBFU (Department of Biology, Fudan University, Shanghai, China 200433).
DBSBMNSNBUMS (Department of Biology, School of Basic Medical Science, Norman Bethune University of Medical Science, Changcun, China).
DPPSAU (Department of Plant Protection, Shenyang Agricultural University, Shenyang 110161, China).
IPPFAAS (Institute of Plant Protection, Fujian Academy of Agricultural Sciences, Fuzhou 350013, China).
TBOBCIQMEA (Tainan Branch Office, Bureau of Commodity Inspection and Quarantine, Ministry of Economic Affairs, Tainan, Taiwan 700, China).
Family Tarsonemidae Canestrini & Fanzago


Subfamily Pseudotarsonemoidinae Lindquist


Tribe Pseudotarsonemoidini Lindquist

Genus *Polyphagotarsonemus* Beer & Nucifora


latus (Banks)


**Hemitarsonemus latus:** Lo & Chao, 1972. *Journal of Taiwan Agricultural Research*, 21(1): 59 (Host: string bean; distribution: Taiwan).


**Polyphagotarsonemus latus:** Kuang, 1983. In: China Academy of Forestry (ed.) For-


14


Polyphagotarsonemus latus: Wang, 1990. *Control of Vegetable Diseases and Insect


Polyphagotarsonemus latus: Zhang et al., 1990. Journal of South China Agricultural University, 11(4): 17 (Damage, population dynamics, chemical control).


Polyphagotarsonemus latus: Li & Lin, 1995. New Control Technique for Pepper and


Polyphagotarsonemus latus: Lin et al., 1995. Journal of Fujian Academy of Agricultural Sciences, 10(1): 45 (Host: pepper, tea, eggplant, orange, tomato, potato, bean, peanut, maple, pumpkins, jute and many flowers, distribution: Fujian).


Genus Pseudotarsonemoides Vitzthum

scolyi Smiley & Moser


Tribe Tarsonemellini Lindquist


Genus Ficotarsonemus Ho


protabilis Ho

ampelas Burn, 6 XI 1993 (J. Y. Wong), at Fonggu, Wufeng, Taichung County, Taiwan; 1 male, 1 female and 1 physogastric female paratype each deposited in CNCIA, Ottawa and other types in DAZTARI, Taiwan).

wongi Ho

Ficotarsonemus wongi Ho, 1994. *International Journal of Acarology*, 20(3):190 (Diagnosis, female and male description; holotype male, allotype female, 10 physogastric females and 6 male paratypes collected on *Ficus virgastar* Reinw. ex Blume; 12 VIII 1993 (W. H. Chen), at Chipen, Taitung County, Taiwan. 1 male and 1 physogastric female paratype each deposited in CNCIA; holotype, allotype and other paratypes deposited in DAZTARI).

Subfamily Acarapinae Schaarschmidt

Acarapinae: Lin et al., 1995. *Journal of Fujian Academy of Agricultural Sciences*, 10(1): 45 (Listed)

Tribe Acarapini Schaarschmidt


Genus Acarapis Hirst


externus Morgenthaler

woodi Rennie

Acarapis woodi: Huang, 1996. China Apiculture, 4:15 (Control by oil from Azadirachta indica).

Subfamily Tarsoneminae Canestrini & Fanzago


Tribe Tarsonemini Canestrini & Fanzago


Genus Daidalotarsonemus DeLeon


biovatus Lin & Liu (Fig. 1)


cornutus Lin, Chen & Zhang

(Host: bark of persimmon tree and mosses; locality: Dehua and Zhangpin city, Fujian province; Types: IPPFAAS)

digital Lin, Chen & Zhang

(Host: mosses on the trunk base of a tree *Sabina chinensis* (L.); locality: Zhangpin city, Fujian province; types: IPPFAAS.)

duolamella Lin, Chen & Zhang


euonymus Yang, Ding & Zhou (Fig. 2)

(Female description, holotype: female, Shanghai, 14 X 1981; on *Euonymus alatus* (Thuni) Sieb; types: in DBFU, Shanghai, China)


**hexagonus** Yang, Ding & Zhou (Fig. 3)


**notoschism** Lin & Liu (Fig. 4)


**serissae** Yang, Ding & Zhou (Fig. 5)


**Genus Fungitarsonemus** Cromroy


acus Lin & Zhang (Fig. 6)


borinquensis Cromroy


lodici (DeLeon)


subtepidariorum Lin & Liu (Fig. 7)

*Fungitarsonemus subtepidariorum* Lin & Liu, 1994. *Entomological Journal of East China*, 3(1): 13 (Male description; holotype male, 7 XI 1989, Meihuashan Natural Reserve (Dagaoxie, Longyan County in Fujian province), ex *Armenica mume* Sieb & Zucc; paratypes: 2 males, same data as holotype; 1 male, same date and location as holotype, ex *Camellia sinensis* (L.) O. Ktixc; 1 male, 1 XI 1989, Mawu, Shanghang County, ex tea; 1 male, 18 X 1989, Jinjiling, Liancheng County, ex the dicotyledonous plant Urticaceae, 3 males, 3 X 1989, Taipingliao, Liancheng County, ex *Eurya muricata* Dum; types: IPPFAAS).

Genus *Iponemus* Lindquist


Genus *Neotarsonemoides* Kaliszewski


*Neotarsonemoides triquetrus* Lin & Zhang

Genus *Rhynchotarsonemus* Beer


sp.


Genus *Tarsonemus* Canestrini & Fanzago


*bambusae* Yin, Bei, Liu, Yu, Shi & Yang (Fig. 8)


*bilobatus* Suski


*brevicorpus* Lin nom. nov. (Fig. 9)


**Notes**: *Cheylotarsonemus minutus* Tseng & Lo, 1980 is preoccupied by *Lupotarsonemus minutus* Attiah, 1970, both now in *Tarsonemus* (Lindquist 1986). As they are different species, the former is a junior homonym of the later and must be replaced. *Tarsonemus brevicorpus* Lin is here proposed as a new name for *minutus* Tseng & Lo; this species is small, hence *brevi* (=short) and *corpus* (=body).
**changbaiensis Yin, Bei, Liu & Tong (Fig. 10)**

*Tarsonemus changbaiensis* Yin et al., 1996. *Journal of Shenyang Agricultural University*, 27(3): 200 (Female description; habitat: soil; locality: Changbai mountain; types: DPPSAU).

**confusus Ewing**


**cornus Ito**

**dubius** Delfinado


**floricolus** Canestrini & Fanzago


**floridanus** (Attiah)


**fusarii** Cooreman


* Tarsonemus fusarii: Yin et al., 1996. *Journal of Shenyang Agricultural University*. 
27(3): 202 (Brief description of adult female; host: mosses; distribution: Shenyang city, Changbai mountain).

**fuzhouensis Lin & Zhang**


**gramineus** Cromroy


**granarius** Lindquist


*Tarsonemus granarius*: Piao, 1990. *Japanese Journal of Sanitary Zoology*, 41(1): 2 (Host: *Asarum heterotropoides* F. Schm. var. *mandshuricum* (Maxim.) Kitag; *Polygonum aviculare* L.; *Pulsatilla chinensis* (Bge.) Reg; *Asparagus cochinchinensis* (Lour) Merr; *Viola yedoensis* Mak; *Andrographis paniculata* (Burm. F.)Nees; *Notopterygium incisum* Ting; *Polygala tenuifolia* Willd; *Juncus*
effusus L. var. decipiens Buchen; Agrimonia pilosa Ledeb. var. japonica (Miq.) Nakai; Phyllostachys nigra (Lodd.) Munro var. henonis (Mitf.) Stapf & Rendle.


idaeus Suski


inornatus (Attiah)


insignis Delfinado


**ips Lindquist**


**lacustris Schaarschmidt**


**lanceatus Lin & Zhang (Figs 11-12)**

Tarsonemus lanceatus Lin & Zhang, 1995. *Wayi Science Journal*, 12: 118 (Female and male description; holotype female, allotype male, 7 paratype females & 1 male, collected from bamboo *Sinocilimus litislorus* (Munro.) McClure on 22 V 1991 from Yanan; paratype 1 female, collected from orange *Citrus tangerina* on 18 V 1991 from Jinqi, Datian County, Fujian; types: IPPFAAS).

**micronodulus Yin, Bei, Liu & Tong (Fig. 13)**

Tarsonemus micronodulus Yin et al., 1996. *Journal of Shenyang Agricultural Univer-

...sity, 27(3): 202 (Female description, host: soil; locality: Changbai mountain; types: DPPSAU).

\textit{minusculus} Canestrini & Fanzago

\textit{Tarsonemus minusculus}: Lin et al., 1995. \textit{Journal of Fujian Academy of Agricultural Sciences}, 10(1): 46 (Host; distribution: Fujian)

\textit{minutus} (Attiah)


\textit{misakai} Ito


\textit{montanus} Yin, Bei, Liu & Tong (Fig. 14)


\textit{myceliophagus} (Hussey)


\textit{nakayamai} Ito


**paragranarius** Piao & Wang (Fig. 15)


**randsi** Ewing


**rhorus** Kaliszewski


**sasai** Ito

scaurus Ewing


shenyangensis Yin, Bei, Liu, Yu, Shi & Yang (Fig. 16)


smithi Ewing


sp.


Tarsonemus sp.: Lo & Ho, 1984. Special Issue of Taiwan Agricultural Research Institute, 16: 237 (Predation by ascid mites).
Tarsonemus sp. nr. endophloeus: Moser, 1985. Transactions of the British Mycological Society, 84(4): 752 (Host of Ceratocystis piceae (Munch) and phoretic on Ips nitidis Eggers from Picea asperata Masters, Gansu, China).
Piper kadsura (Choisy) Ohwi; Eriocaulon buergerianum Koern, Potentilla discolor Bge, Polygala tenuifolia Wild.).


stricketti Smiley


subcorticalis Lindquist


takaoensis Ito


talpae Schaarschmidt


Tarsonemus talpae: Zhou & Xia, 1985. Integrated control in Agricultural Cultivation,


**teqmen** (Lin & Zhang) (Fig. 17)


*Ceratotarsonemus teqmen*: Ochoa et al., 1997. *International Journal of Acarology*, 23(3): 177 (Transfer from *Ceratotarsonemus* to *Tarsonemus*).

**uniunguis** Lin & Zhang (Figs 18-19)

1989 from Penkou, Liancheng county, Fujian; types: IPPFAAS).

**virigineus** Suski


**waitei** Banks


**wangi** Lin & Zhang (Figs. 20-22)


Genus *Xenotarsonemus* Beer, 1954


*belemnitoides* (Weis-Fogh)


*ligula* Lin & Zhang


*sensus* Lin & Zhang (Figs 23-24)


*uliginosus* Willmann

wani (Tseng & Lo) (Fig. 25)

*Tarsonemus wani* Tseng & Lo, 1980. *Plant Protection Bulletin*, 22: 118 (Female description; holotype female, South Taipei, ex green algae on surface of paddy field, 25 II 1977 (P. K. C. Lo); paratype, 2 females, the same data as for holotype; types: in TBOBCIQMEA)


**Tribe Hemitarsonemini Lindquist**


**Genus Hemitarsonemus Ewing**


*biconvexa* Lin & Zhang (Fig. 26)


*furcalis* Lin & Zhang (Figs 27-28)


**Tribe Steneotarsonemini Lindquist**


**Genus Dendroptus Kramer**


*edwardi* Delfinado


**Genus Ogmotarsonemus Lindquist**


*liui* Lin & Zhang (Fig. 29)


Genus *Steneotarsonemus* Beer


Subgenus *Mahunkacarus* Wainstein

*badulini* Wainstein


*gibber* Suski


Subgenus *Neosteneotarsonemus* Tseng & Lo


**arcticus** Lindquist


**guangzensis** Lin, Zhang & Liu (Figs 30-31)


**mirabilis** Tseng & Lo


**trisetus** Lin *et Zhang* (Figs 32-33)
Steneotarsonemus (Neosteneotarsonemus) trisetus Lin & Zhang, 1995. *Wuyi Science Journal*, 12: 114 (Female and male description; holotype female, allotype male, 7 paratype females & 20 males, collected from the leaf sheath of: co-ba *Zizania cauduciflora* (Turcz); Hand.-Mazz. on 23 X 1994, from Zhangpu county; paratype: 1 female & 5 males, on 4 X 1994, from Pingtan County; paratypes 3: females & 1 male on 29. X. 1994, from Changtai county, same host as holotype; types: IPPFAAS).

**Subgenus Steneotarsonemus** Beer

*acricorn* Lin & Zhang (Figs 34-35)


*bancrofti* Michael


*chiaoi* Tseng & Lo (Fig. 36)


Steneotarsonemus furcatus: DeLeon


Steneotarsonemus furcatus: Lin et al., 1995. Journal of Fujian Academy of Agri-

*Steneotarsonemus phragmitidis* (Schlectendal)


*Steneotarsonemus pulchellus* Tseng & Lo (Fig. 37)

Steneotarsonemus pulchellus Tseng & Lo, 1980. *Plant Protection Bulletin*, 22(1): 122 (Diagnosis; male and female description; holotype male, Talli, Taichung Hsien, ex weeds, 4 XII 1977 (Y. H. Tseng); allotype, female, the same data as for holotype; paratype, 2 male, 1 female, 2 larvae and 2 pupae, the same data as for holotype; types: in TBOBCIQMEA)


*rivalis* (Tseng & Lo) (Fig. 38)


*sp.*


*Steneotarsonemus* sp.: Lin et al., 1982. *Fujian Agricultural Science and Technology*, (1): 36 (Description of different stages; habits and injury).


*spinki* Smiley


Steneotarsonemus spinki: Lo et al., 1981. Journal of Agricultural Researches in China, 30(3): 303 (Parathion and dicofol were very effective in controlling this mite).


Steneotarsonemus spinki: Lo & Ho, 1984. Special Issue of Taiwan Agricultural Research Institute, 16: 235 (Life history and predation by its natural enemy).


Steneotarsonemus spinki: Tseng, 1984. In: Griffiths & Bowman (ed.) Acarology VI,


spirifex (Marchal)

Steneotarsonemus subfurcatus Lin & Zhang (Figs 39-41)


Steneotarsonemus zhejiangensis Ding & Yang (Figs 42-43)


Undetermined tarsonemid species


References

ACSC (Agricultural College of South China (ed.)) (1963) Agricultural Entomology.


Lin, J.-Z. & Zhang, Y.-X. (1990) A new species of the genus *Steneotarsonemus* from
Lindquist, E.E. (1986) The world genera of Tarsonemidae (Acari: Heterostigmata): a morphological, phylogenetic, and systematic revision, with a reclassification of


Journal of Agricultural Research of China, 33(1), 81-87.


Illustrations

The following illustrations are provided for most species described in China in journals not commonly available outside China. Illustrations of Chinese species published in international journals (e.g. *International Journal of Acarology* and *Systematic & Applied Acarology*) in English are not included.
FIGURE 1. *Daidalotarsonemus biovatus* Lin & Liu (Female). A, Dorsal (left) and ventral (right) view; B-E, Legs I-IV, respectively; after Lin & Liu, 1995.
FIGURE 3. Daidalotarsonemus hexagonus Yang, Ding & Zhou (Female). A, dorsal view; B, ventral view; after Yang et al., 1987.
FIGURE 4. *Daidalotarsonemus notoschism* Lin & Liu (Female). A, dorsal view; B, ventral view; C-F, legs I-IV, respectively; after Lin & Liu, 1994.
FIGURE 6. *Fungitarsonemus acus* Lin & Zhang (Female). Dorsal (left) and ventral (right) view; after Lin & Zhang, 1994.
FIGURE 7. Fungitarsonemus subtepidariorum Lin & Liu (Male). A, dorsal (right) and ventral (left) view; B, tarsus I; C, tarsus II; D, tarsus III; leg IV (ventral view); Lin & Lin, 1994.
FIGURE 8. Tarsonemus bambusae Yin et al. (Female). A, dorsal (right) and ventral view; B, leg I; C, leg II; after Yin et al., 1998.
FIGURE 9. Tarsonemus brevicorpus Lin (Female). A, dorsal view; B, ventral view; C, trichobothrium; D, leg IV; after Tseng & Lo, 1980.
FIGURE 10. Tarsonemus changbaiensis Yin, Bei, Liu & Tong (Female). A, dorsal (right) and ventral (left) view; B, leg I; C, leg II; after Yin et al., 1996.
FIGURE 11. *Tarsonemus lanceatus* Lin & Zhang (Female). Dorsal (right) and ventral (left) view; after Lin & Zhang, 1995.
FIGURE 13. *Tarsonemus micronodulus* Yin, Bei, Liu & Tong (Female). A, dorsal (right) and ventral (left view), B, leg I; C, leg II; after Yin et al., 1996.

FIGURE 14. *Tarsonemus montanus* Yin, Bei, Liu & Tong (Female). A, dorsal (right) and ventral (left view), B, leg I; C, leg II; after Yin et al., 1996.
FIGURE 15. *Tarsonemus paragranarius* Piao & Wang (Male). Dorsal (right) and ventral (left); after Piao & Wang, 1992.
FIGURE 17. *Tarsonemus teqmen* (Lin & Zhang) (Female). A, dorsal (right) and ventral (left) view; B-E, legs I-IV, respectively; after Lin & Zhang, 1995.
FIGURE 18. *Tarsonemus uniunguis* Lin & Zhang (Female). Dorsal (right) and ventral (left) view; after Lin & Zhang, 1995.
FIGURE 23. *Xenotarsonemus sensus* Lin & Zhang (Female). Dorsal (right) and ventral view); after Lin & Zhang, 1994.
FIGURE 24. *Xenotarsonemus sensus* Lin & Zhang (Male). Dorsal (right) and ventral view); after Lin & Zhang, 1994.
FIGURE 25. *Xenotarsonemus wani* (Tseng & Lo) (Female). A, dorsal view; B, ventral view; C, leg I; D, leg II; E, leg IV; F, trichobothrium; after Tseng & Lo, 1980.
FIGURE 27. *Hemitarsonemus furcalis* Lin & Zhang (Female). Dorsal (right) and ventral (left) view; after Lin & Zhang, 1995.
FIGURE 28. *Hemitarsonemus furcalis* Lin & Zhang (Male). Dorsal (right) and ventral (left) view; after Lin & Zhang, 1995
FIGURE 29. Ogmotarsonemus liui: Lin & Zhang (Female). A, dorsal (right) and ventral (left) view; B, tibiotarsus I; C, tarsus II; after Lin & Zhang, 1993.
FIGURE 30. *Steneotarsonemus* (*Neosteneotarsonemus*) *guangzensis*: Lin, Zhang & Liu (Female). Dorsal (right) and ventral (left) view; after Lin et al., 1995.
FIGURE 31. Steneotarsonemus (Neosteneotarsonemus) guangzensis: Lin, Zhang & Liu (Female). A-D, legs I-IV, respectively; after Lin et al., 1995
FIGURE 32. Steneotarsonemus (Neosteneotarsonemus) trisetus Lin & Zhang (Female). Dorsal (right) and ventral (left) view; after Lin & Zhang, 1995.
FIGURE 33. *Steneotarsonemus (Neosteneotarsonemus) trisetus* Lin & Zhang (Male). Dorsal (right) and ventral (left) view; after Lin & Zhang, 1995
FIGURE 34. Steneotarsonemus (Steneotarsonemus) acricorn Lin & Zhang (Female). Dorsal (right) and ventral (left) view; after Lin & Zhang, 1995.
FIGURE 35. *Steneotarsonemus (Steneotarsonemus) acricorn* Lin & Zhang (Male). Dorsal (right) and ventral (left) view; after Lin & Zhang, 1995.
FIGURE 36. *Steneotarsonemus chiaoi* Tseng & Lo. A, dorsal view of male; B, ventral view of male; C, dorsal view of female; D, ventral view of female; E, leg IV of male; F, leg II of male; G, leg III of male; H, tracheal system; I, trichobothrium; after Tseng & Lo, 1980.
FIGURE 37. *Steneotarsonemus pulchellus* (Tseng & Lo). A, dorsal view of male; B, ventral view of male; C, dorsal view of female; D, ventral view of female; E, trichobothrium; F, leg IV of female; G, leg III of female; H, tracheal system; I, leg IV of male; after Tseng & Ho, 1980.
FIGURE 38. *Steneotarsonemus rivalis* (Tseng & Lo) (Female). A, dorsal view; B, ventral view; C, trichobothrium; D, tracheal system (tp = tracheal plate); E, leg IV; F, anal region; after Tseng & Lo, 1980.
FIGURE 41. Steneotarsonemus subfurcatus Lin & Zhang (Female). A-D, legs I-IV, respectively; after Lin & Zhang, 1990.
FIGURE 42. *Steneotarsonemus zhejiangensis* Ding & Yang (Male). A, dorsal view; B, ventral view; C, enlarged view of B; D-G, legs I-IV, respectively; after Ding & Yang, 1984.
FIGURE 43. *Steneotarsonemus zhejiangensis* Ding & Yang (Female). A, dorsal view; B, ventral view; C, enlarged view of A; D-G, legs I-IV, respectively; after Ding & Yang, 1984.
Index to taxa

A
Acarapinae 22
Acarapini 22
acricorn 48, 108-109
acus 26, 81
arcticus 47
asiaticus 27

B
badulini 46
bambusae 29, 83
bancrofti 48
belemnitoides 43
biconvexa 44, 100
bilobatus 29
biorhina 23, 76
boringuensis 26
brevicornus 5, 29, 84

C
changbaiensis 30, 85
chiaoi 48, 110
confusus 30
cornus 30
cornutus 24

D
Daidalotarsonemus 23
Dendroptus 45
digital 24
dubius 31
duolamella 24

E
edwardi 45
euonymus 24, 77
externus 22

F
Ficotarsonemus 21
floricolas 31
floridanus 31
Fungitarsonemus 25
furcata 44, 101-102
furcatus 49
fusarii 31
fusmus 32

G
gibber 46
gramineus 33
granarius 33
guangzouensis 47, 104-105

H
Hemitarsonemini 44
Hemitarsonemus 44
hexagonus 25, 78

I
idaeus 34
inornatus 34
insignis 34
Iponemus 27
ipsi 35

K
konoi 50

L
laevisris 35
lanceatus 35, 86-87
latus 11
leisonotum 27
ligula 43
liui 45, 103
lodici 26

M
Mahunkacarus 46
micronodulus 35, 88
minutus 36
mirabilis 47
misakai 36
montanus 36, 88
myceliophagus 36

N
nakayamai 36
Neosteneotarsonemus 47
Neotarsonemoides 37
notuschism 25, 79

O
Ogmotarsonemus 45

P
paragranarius 37, 89
paraunguis 37
phragmitidis 50
Polyphagotarsonemus 10
probabilis 21
Pseudotarsonemoides 21
Pseudotarsonemoidinii 10
puilchellus 50, 111

lin & zhang: tarsonemidae of china
R
randsi 37
rharus 37
rivulus 51, 112
Rynchotarsonemus 28
S
sasai 37
scaurus 38
scolyti 21
sensus 43, 97-98
serisisae 25, 80
shenyangensis 33, 90
smithi 38
spinki 52
spirifici 55
Steneotarsonemini 45
Steneotarsonemus 36, 48
stricketti 40
subcorticalis 40
subfurcatus 55, 113-115
subtepidariorum 26, 82
T
takaoensis 40
talpae 40
Taronemellini 21
Taroneminae 23
Taronemini 23
Taronemus 28
teqmen 41, 91
triquetrus 27
trisetus 48, 106-107
U
uliginosus 43
uniunguis 41, 92-93
V
virginensis 42
W
waitei 42
wangi 42, 94-96
wani 44, 99
wongi 22
woodi 23
X
Xenotarsonemus 43
Z
zhejiangensis 55, 116-117