

KAWAKATSU-&-SASAKI's WEBPAGES ON PLANARIANS, SAPPORO AND TÔKYÔ. No. 37. Aug. 17, 2002.
 (A continuation from the 'Occ. Publ., Biol. Lab. Fuji Women's College, Sapporo (Hokkaidô), Japan': Nos. 1-34, for
 1970-2000; ISSN 0917-4362.)

A List of Triclad Turbellarians from México in Kawakatsu's Collection

Last update: August 19, 2002

<http://planarian.net/kswp/37/mexico.pdf> (present text)

http://planarian.net/kswp/37/mexico_p.pdf (color plates)

By Masaharu KAWAKATSU (E-mail (Miss Miyuki Kawakatsu): DQA01524@nifty.ne.jp), Robert W. MITCHELL (E-mail: mitchell@indiancreek.net), Ronald SLUYS (E-mail: sluys@science.uva.nl) and Gen-yu SASAKI (E-mail: gen-yu@mtc.biglobe.ne.jp)

Introduction

A. General Comments on Kawakatsu's Collection of Turbellarian Samples

Kawakatsu has been amassing his Collection of Turbellarian Samples (mostly freshwater and land planarians, with several brackish water and marine species) since 1953. Following are approximate amounts in the Collection.*

- 1) **Slides.** Serial sections: Mapped (for 30 slides), ca. 370 mappes (=11,000 slides); Slide Box (for 100 slides), ca. 100 boxes (=10,000 slides); Whole Mounts, ca. 100 or more slides.
- 2) **Preserved specimens kept in 70% ethanol.** Small Tubes (72mm long and 18mm in diameter), ca. 1,000 tubes; Sample Bottles (20cm high and 18cm in diameter), ca. 20 bottles. Each bottle contains 15-30 tubes of land planarian samples.
- 3) **Black-and-white films (photos of preserved specimens, etc.), pencil sketches and documents, Fixing Notebook, etc.**

*This brief list does not include the slides of several type series which will be sent to the National Museum of Natural History (Zoology Department), Tôkyô, and the following slides that have been sent to Dr. Sluys (Amsterdam) during the past several years. The latter are as follows:

- a) Freshwater planarians (FP) from Australia and New Zealand (cf. Kawakatsu, Murayama & Ôgawara, 1995a, b; Sluys, Kawakatsu & Winsor, 1998; Sluys & Kawakatsu, 2001).
- b) FP from Nepal and India (cf. Kawakatsu, Yoneda & Murayama, 1996a, b).
- c) FP from Uruguay (in part), Argentina (in part) and Chile (in part).
- d) FP from Roumanian caves.
- e) Several samples of marine triclads from Japan (cf. Sluys & Kawakatsu, 2000), Korea and King George Island of the Antarctic.

The following samples are also excluded:

- f) New Samples from México and Southern Texas. They are listed in the present web article (ca. 800 slides and 30 tubes of preserved specimens).
- g) Two new bipaliid species from Hokkaidô (ca. 180 slides). The Ms. is now in preparation.

The occasions of the past 3 International Meetings ---the VIIIth International Symposium on the Biology of the Turbellaria (Brisbane, August 16-23, 1996), the OECD International Workshop on Terrestrial Planarians

(Christchurch, February, 16-20, 1998) and the IXth ISBT (Barcelona, June 26-July 1, 2000) --- brought Kawakatsu and Sluys together where they discussed a cooperative study plan for Kawakatsu's Collection. It was agreed to expedite the transfer of the Collection from Kawakatsu, who has been keeping the Collection in his home, into the hands of the Zoölogisch Museum, Universiteit van Amsterdam, The Netherlands. This work is now in progress.

B. New Samples from México and Southern Texas in the US

During the past 30 years, Kawakatsu obtained a considerable number of preserved specimens of freshwater planarians from México (United Mexican States). The main sources of these samples are Mitchell-&Kawakatsu's 1971 and 1973 collections. Additional samples (mostly freshwater planarians, with some land and marine planarians) were received occasionally from Mitchell and J. Reddell.

Some of these samples have already been studied and reported on in several taxonomic papers (cf. Mitchell & Kawakatsu, 1972a, b, 1973; Kawakatsu & Mitchell, 1981a, b, 1983, 1984a, b). However, samples from 65 localities (59 from México and 6 from Southern Texas) were not studied during Kawakatsu's tenure of office at Fuji Women's College, although most have already been sectioned.

In the following lists, Kawakatsu's Specimen Lot Numbers given for each sample (those registered in Kawakatsu's Fixing Notebook according to his permanent recording system) are shown. An asterisk attached to the Lot No. means the samples have already been prepared as serial sections by Kawakatsu.

1. Freshwater Planarians from México: The 1972-1973 Collection by Dr. Mitchell's Team

No. 1. Lot No. 1209.* *Girardia* sp. of Pozo de Guadalupe. A single sexual and 3 asexual specimens; pale brown above; 6-7mm long and 0.8mm wide; fixed with 70% ethanol. Loc.: A stream at Pozo de Guadalupe, San Luis Potosí. Coll. Mitchell; Nov. 24, 1972.

No. 2. Lot No. 1210. *Girardia* sp. of Comedor del Diablo. Three asexual specimens; pale brown above; 6-7 mm long and 0.8mm wide; fixed with 3% formalin solution. Loc.: A stream at Comedor del Diablo, 5km NW Apala, Oaxaca. Coll. D. McKenzie; Jan. 3, 1973.

No. 3. Lot No. 1211. *Girardia* sp. of Río Jalpan. A single asexual specimen; pale brown above; 7mm long and 0.8mm wide; fixed with 70% ethanol. Loc.: A stream of Río Jalpan, 16.5 km N of Jalpan, Queretaro. Coll. Mitchell; Feb. 22, 1973.

No. 4. Lot No. 1212.* *Girardia* sp. of Tamaulipas. About 10 asexual specimens; pale brown above; 7-8mm long and 0.8mm wide; fixed with 70% ethanol. Loc.: A stream at K192, highway 101, Tamaulipas. Coll. Mitchell, S. Wiley and C. McConnell; Feb. 23, 1973.

No. 5. Lot No. 1213.* *Girardia* sp. of Lago Patzcauro. Many asexual specimens; pale brown above, 7-10mm long and 0.8-1mm wide; fixed with 70% ethanol. Loc.: Lago Patzcauro, Patzcauro, Michoacan. Coll. G. Mengden; Mar. 27, 1973.

Note. Benazzi (1972: 404) reported a Mexican *Dugesia* species as follows: "Estado do Michoacan, Lago Patzcauro, m 2175, 7 febbraio 1971, Argano e Zullini *leg.*: 5 esemplari conservati in alcool, 4 dei quali piccoli ed uno di notevoli dimensioni (lunghezza circa II mm).... Anche questa planaria può essere attribuita al gen. *Dugesia*."

The locality of the Lot No. 1213 seems to be the same with the locality cited above.

2. Freshwater Planarians from México: The 1973 Summer Collection by Drs. Mitchell and Kawakatsu

No. 6. Lot No. 1220.* *Girardia* sp. of San Luis Potosí (**photo 1**). Five asexual specimens; dark brown above; 18mm long and 2.5mm wide (a single, large specimen); 8-10mm long and 1mm wide (4 fissioparous specimens); fixed with Bouin's fluid. Loc.: A stream along highway 57, 44km S of San Luis Potosí. Coll. Mitchell, Kawakatsu et al.; July 19, 1973.

No. 7. Lot No. 1221.* *Girardia* sp. of San Juan del Río (**photos 2-3**) Many asexual specimens; brown above; 18mm long and 2mm wide (several large specimens); 10-12mm long and 1-1.5mm wide (many fissioparous specimens); fixed with Bouin's fluid. Loc.: A sluggish stream along highway 57, San Juan del Río, Queretaro (alt. 1830m). Coll. Mitchell, Kawakatsu et al.; July 20, 1973 (w.t., 19-22°C).

No. 8. Lot No. 1222.* *Girardia* sp. of near Tula (**photo 4**) Fifteen sexual and asexual specimens; very dark brown to black above, with many, small, black spots; 10mm long and 1mm wide; fixed with Bouin's fluid. Loc.: A small stream along highway 57 at a point 20km N of the junction of the road to Tula and highway 57, State of México (alt. 2500m). Coll. Mitchell, Kawakatsu et al.; July 20, 1973 (w.t., 22°C).

No. 9. Lot No. 1223.* *Girardia* sp. of Presa Tejocotal-1 (**photo 5**). A single sexual and many asexual specimens; moderately brown above; 20mm long and 3.5mm wide (a few specimens); 8-15 mm long and 1-2 mm wide (many fissiparous specimens); fixed with Bouin's fluid. Loc.: A stream along highway 130, Presa Tejocotal, Hidalgo (alt. 2135m). Coll. Mitchell, Kawakatsu et al.; July 21, 1973 (w.t., 17-26°C; pH 5.2).

No. 10. Lot No. 1224.* *Girardia* sp. of Presa Tejocotal-2. A single sexual (non-fully matured) and several asexual specimens; pale yellowish brown above; 18mm long and 3mm wide (2 specimens); 10-15mm long and 1-2mm wide; fixed with Bouin's fluid. Loc.: A pond along highway 130, Presa Tejocotal, Hidalgo. Coll. Mitchell, Kawakatsu et al.; July 21, 1973.

No. 11. Lot No. 1225. *Girardia* sp. of Huauchinango. Two sexual specimens; pale brown above; 12mm long and 1.5mm wide; fixed with Bouin's fluid. Loc.: A small, steep stream along highway 130, 5.6km W of Huauchinango, Puebla (alt. 1830m). Coll. Mitchell, Kawakatsu et al.; July 21, 1973 (w.t., 16°C; pH 5.0).

No. 12. Lot No. 1226.* *Girardia* sp. of Vega do Alatorre-1 (**photo 6**). Four asexual specimens; pale yellowish brown above; 8-10mm long and 1-1.5mm wide; fixed with Bouin's fluid. Loc.: A stream at 5km N of Vega do Alatorre (99km N of the City of Veracruz), Veracruz. Coll. Mitchell, Kawakatsu et al.; July 22, 1973 (w.t., 29°C; pH 6.2).

No. 13. Lot No. 1227. *Girardia* sp. of Vega do Alatorre-2 (**photo 7**). Nine asexual specimens; pale brown above with numerous, small, whitish and yellowish spots; 8mm long and 0.8mm wide; fixed with Bouin's fluid. Loc.: The same with the Lot No. 1226. Coll. Mitchell, Kawakatsu et al.; July 21, 1973.

Note. Judging from the head shape (without a pair of long and pointed auricles) and conspicuous punctuated body, the animal of the Lot No. 1227 seems to be *Girardia tigrina* (Girard, 1850).

No. 14. Lot No. 1228. *Girardia* sp. of Tierra Blanca (**photos 8-9**). Ten asexual specimens; pale brown above; 6-8mm long and 0.8-1mm wide; fixed with Bouin's fluid. Loc.: A small stream along highway at a point 6km W of the junction of Tierra Blanca and Atlan, on the road to Veracruz, Veracruz (alt. 61m). Coll. Mitchell, Kawakatsu et al.; July 23, 1973 (w.t., 23°C; pH 5.6).

No. 15. Lot No. 1229.* *Girardia* sp. of Palenque-1 (**photo 10**). Forty-three sexual and asexual specimens; moderately brown above; 10-15mm long and 1-1.5mm wide; fixed with Bouin's fluid. Loc.: A shallow stream at 5km N of Ruinas de Palenque, Chiapas (alt. 300m). Coll. Mitchell, Kawakatsu et al.; July 25, 1973.

No. 16. Lot No. 1230.* *Girardia* sp. of Palenque-2. Approximately 15 sexual and 65 asexual specimens; dark brown to black above; 10-15mm long and 2-2.5mm wide; fixed with Bouin's fluid. Loc. A stream along Ocoingo road at 20km N of Ruinas de Palenque, Chiapas. Coll. Mitchell, Kawakatsu et al.; July 26, 1973.

No. 17. Lot No. 1231.* *Girardia* sp. of Palenque-3. Six sexually mature and 2 asexual specimens; pale brown above; 10-12mm long and 2mm wide; fixed with Bouin's fluid. Loc. A stream along Ocoingo road at 20km N of Ruinas de Palenque, Chiapas. Coll. Mitchell, Kawakatsu et al.; July 26, 1973.

No. 18. Lot No. 1232.* *Girardia* sp. of Palenque-4. Three sexual and a single asexual specimens (with a pair of neutral and non-pointed auricles); pale brown above; 10-12mm long and 2-2.5mm wide; fixed with Bouin's fluid. Loc. The same with the Lot No. 1231. Coll. Mitchell, Kawakatsu et al.; July 26, 1973.

No. 19. Lot No. 1233.* *Girardia* sp. of Palenque-5 (**photo 11**). Seventeen sexual and several asexual specimens (including fission pieces); brown above; 10-15mm long and 1.5-2.5mm wide; fixed with Bouin's fluid. Loc. A small stream at 1km N of Ruinas de Palenque, Chiapas. Coll. Mitchell, Kawakatsu et al.; July 27, 1973 (w.t., 24.5°C; pH 5.6).

No. 20. Lot No. 1234.* *Girardia* sp. of Palenque-6 (**photo 12**). Eleven sexual and 17 asexual specimens; brown above; 10-20mm long and 1.5-2.5mm wide; fixed with Bouin's fluid. Loc.: A stream along Ocoingo road at 21km SW of Ruinas de Palenque, Chiapas. Coll. Mitchell, Kawakatsu et al.; July 27, 1973.

No. 21. Lot No. 1235.* *Girardia* sp. of Kabachén (**photo 13**). Seven sexual and 12 asexual specimens; pale brown above; 10-12mm long and 1.5mm wide; fixed with Bouin's fluid. Loc.: Cenote Kabachén, Maní, Yucatan. Coll. Mitchell, Kawakatsu et al.; Aug. 1, 1973 (w.t. 16°C).

No. 22. Lot No. 1236. *Girardia* sp. of Amil. A single, asexual specimen; brown above; 10mm long and 1mm wide; fixed with Bouin's fluid. Loc.: Cenote Amil, near Chacsinicche, N of Muna, Yucatan. Coll. Mitchell, Kawakatsu et al.; Aug. 5, 1973.

No. 23. Lot No. 1237.* *Girardia* sp. of Palenque-1. About 40 sexual and over 160 asexual specimens; mod-

moderately brown above; 10-18mm long and 1-2.5mm wide; fixed with Bouin's fluid. Loc.: shallow streams at 5km N of Ruinas de Palenque, Chiapas (alt. 300m). Coll. Mitchell, Kawakatsu et al.; Aug. 11, 1973 (w.t., 14°C; pH 5.6).

Note. This is the same locality as that of Lot No. 1229. There are several shallow streams in this forest area.

No. 24. Lot No. 1238. *Girardia* sp. of Oaxaca. Four asexual specimens (and several fissioned pieces); dark brown above; 6-8mm long and 0.8-1mm wide; fixed with Bouin's fluid. Loc.: A small stream along highway 185 at K87, 6km N of Donaji, Oaxaca (alt. ca. 400m). Coll. Mitchell, Kawakatsu et al.; Aug. 12, 1973 (w.t., 8.2°C).

No. 25. Lot No. 1239. *Girardia* sp. of Tamazulapan (**photo 14**). Two asexual specimens; pale brown above; 8-15mm long and 1mm wide; fixed with Bouin's fluid. Loc.: A stream along highway 190 at K15, Tamazulapan, SE of Hauajuapan de León, Oaxaca (alt. 2105m). Coll. Mitchell, Kawakatsu et al.; Aug. 15, 1973 (w.t., 23.5°C; pH 5.2).

No. 26. Lot No. 1240. *Girardia azteca* (Benazzi et Giannini, 1971) (**photos 15-19**). Numerous specimens (mostly sexually matured); blackish-brown above with numerous, small, whitish spots; 20-25mm long and 3-4mm wide; fixed with Bouin's fluid; many cocoons were also obtained (2.5-3mm in diameter with a filiform stalk). Loc.: A pond and mountain streams associated with it, El Zarco, approximately 30km SW of México, D. F., México (alt. 3100m; lat. 19°30' N and long. 99°45' W). Coll. Mitchell, Kawakatsu et al.; Aug. 16, 1973 (12°C; pH 5.2).

Note. This species was at first described as *Cura azteca* by Benazzi & Giannini in 1971. Its type locality is El Zarco, Puerto de Las Cruces, México, D.F., México.

A detailed taxonomic redescription of this species was given by Kawakatsu & Mitchell (1984), under the name of "*Dugesia azteca*". Detailed collection data with 4 black-and-white photos showing the locality are also given in that paper cited above.

3. Freshwater Planarian from México: Additional Samples

No. 27. Lot No. 1449.* *Girardia* sp. of Cueva del Brinco. A single sexual specimen (broken head is lost); pale brown above (in the preserved condition); ca. 10mm long and 1.5mm wide; fixed with 70% ethanol. Loc.: A small pool in Cueva del Brinco, Tamaulipas. Coll. R. Jameson, D. McKenzie and F. Perez; Aug. 24-27, 1973.

No. 28. Lot No. 1450.* *Girardia* sp. of Cueva de San Rafael. A single, sexual specimen; grayish brown above (preserved sample); 12mm long and 1.5mm wide; fixed with 70% ethanol. Loc.: A small pool in Cueva de San Rafael, 10km SW of Aquismón, San Luis Potosí. Coll. P. Strickland; Dec. ?, 1973.

No. 29. Lot No. 1451.* *Girardia* sp. of Cueva del Azufra. A single sexual (not fully matured) and approximately 20 asexual specimens; pale brown above (preserved sample); 8mm long and 0.8-1mm wide; fixed with 70% ethanol; 2 cocoons were also obtained. Loc.: A small pool in Cueva del Azufra, 3km N of Tapijulapa, Tabasco. Coll. J. Reddell, A. Grubbs, D. McKenzie and S. Wiley; June 15, 1975.

No. 30. Lot No. 1452.* *Girardia* sp. of Cueva del Nacimiento. A single sexual specimen; whitish brown above (preserved sample); ca. 10mm long and 1mm wide (strongly curved ventrally); fixed with 70% ethanol. Loc.: A small pool in Cueva del Nacimiento, Rancho Nuevo, 14km N of Potrero, Veracruz. Coll. J. Reddell; Jan. 7, 1977.

No. 31. Lot No. 1453.* *Girardia* sp. of Sótano de las Golondrinas. Four sexual and 3 asexual specimens; brown above (preserved sample); 10-15mm long and 1.5-1.8mm wide; fixed with 70% ethanol. Loc. Sótano de las Golondrinas, Manzanilla, 11km N of Potrero, Veracruz. Coll. A. Grubbs; Jan 8, 1977.

No. 32. Lot No. 1454.* *Girardia* sp. of Cueva de Campamiento. A single sexual and 11 asexual specimens; dark brown above with numerous, small, black pigment spots (preserved sample); 10-12mm long and 1.5 mm wide; fixed with 70% ethanol. Loc.: A pool in Cueva de Campamiento, 2km E of Cerro de la Luz, San Luis Potosí. Coll. R. Jameson; May 15, 1977.

No. 33. Lot No. 1497.* *Girardia* sp. of Cueva de Oyamal. Eight sexual and 17 asexual specimens; brown above with many, small and whitish spots (preserved sample); 12-16mm long and 2-2.5mm wide; fixed with 70% ethanol. Loc.: Cueva de Oyamal, Conrado Castillo, Tamaulipas. Coll. A. Grubbs, D. Pate, M. Cassey, and C. Green; Mar. 19, 1978.

No. 34. Lot No. 1701. *Girardia* sp. of Sótano de Guadalupe. Two sexual and 3 (2 of them were dried up when received) asexual specimens; pale brown above with numerous dark pigments (preserved sample); 10mm long and 1mm wide; fixed with 3% formalin solution. Loc.: Sótano de Guadalupe, 10km W of Aquismón, San Luis Potosí. Coll. D. Pate; Mar. 18, 1980.

No. 35. Lot No. 1702. *Girardia* sp. of Entrada del Viento Bajo. A single sexual specimen; pale brown above with numerous dark pigments (preserved sample); 15mm long and 2.5mm wide; fixed with Bouin's fluid. Loc.: A narrow stream at Entrada del Viento Bajo, Tamaulipas. Coll. L. Wilk; June 28, 1978.

No. 36. Lot No. 1703. *Girardia* sp. of Agua de los Allarines. Two sexual and 2 asexual specimens; pale

brown above with numerous dark pigments (preserved sample); 12-14mm long and 1-1.5mm wide; fixed with Bouin's fluid. Loc. Agua de los Allarines, 0.5km N of Conrado Castillo, Tamaulipas. Coll. P. Sprouse; Oct. ?, 1979.

No. 37. Lot. No. 1704. *Girardia* sp. of Sótano de las Calenturas. Two sexual and 3 asexual specimens; pale brown above (preserved sample); 12-15mm long and 1-2mm wide; fixed with 3% formalin solution. Loc.: Sótano de las Calenturas, Yerbuena, Tamaulipas. Coll. D. Pate; Nov. 23, 1979.

No. 38. Lot. No. 1705. *Girardia* sp. of Sótano de las Golondrinas. Two sexual and 3 asexual (partly broken) specimens; pale brown above (preserved sample); 8-10mm long and 0.8-1mm wide; fixed with 3% formalin solution. Loc.: Sótano de las Golondrinas, 10km W of Aquismón, San Luis Potosí. Coll. P. Sprouse; Mar. 20, 1980.

No. 39. Lot. No. 1706. *Girardia* sp. of Cueva de los Ladrones. Five asexual specimens; pale brown above (preserved sample); 6-8mm long and 0.8mm wide; fixed with 3% formalin solution. Loc.: Cueva de los Ladrones, La Silleta, San Luis Potosí. Coll. P. Sprouse; Apr. 1, 1980.

No. 40. Lot. No. 1707. *Girardia* sp. of Cueva los Viet Cong. Two sexual (?) and 3 asexual specimens; dark grayish brown above (preserved sample); 10-12mm long and 1mm wide; fixed with 3% formalin solution. Loc.: A pool in Cueva de los Viet Cong, Xilitla Plateau, San Luis Potosí. Coll. D. Pate and P. Sprouse; Apr. 1, 1980.

Note. Animals of Lot Nos. 1701-1707 are kept in tubes with 70% ethanol; serial sections for microscopic examination have not yet prepared.

No. 41. Lot No. 1881.* *Girardia* sp. of Cueva del Tecolote. Six sexual specimens; dark brown above (preserved sample); 12-15mm long and 2.5-3mm wide; fixed with 70% ethanol. Loc.: A pool in Cueva del Tecolote, Los San Pedro, Tamaulipas. Coll. P. Sprouse; Nov. 18, 1984. (Received from J. Reddell.)

4. Freshwater Planarians from México: The 1984 Collection from Baja California by Dr. and Mrs. Mitchell

No. 42. Lot. No. 1730. *Girardia* sp. of Arroyo San Vicente (**photo 20**). Twelve asexual specimens; brown above; 8-12mm long and 1-1.5mm wide; fixed with Bouin's fluid. Loc.: Arroyo San Vicente, 22.5km S of Santo Tomás, Baja California. Coll. R. & L. Mitchell, F. Abernethy; June 12, 1984 (w.t., 24°C).

Mitchell's Note. Animals were obtained under small rocks in small, flowing stream about 17km inland from where this stream enters Pacific Ocean.

No. 43. Lot. No. 1731. *Girardia* sp. of Arroyo Parras (**photo 21**). Two sexual and 8 asexual specimens; very dark brown above; 10-15mm long and 1.5-2.5mm wide; fixed with Bouin's fluid. Loc.: Arroyo Parras, Sierra de la Giganta, 14km from the Transpeninsular Highway (México 1) on road to Misión San Javier de Vigge, Baja California. Coll. R. & L. Mitchell; July 5, 1984 (w.t., ca. 34°C).

Mitchell's Note. This arroyo evidently flows only at times of heavy rainfall. There are also springs that supply it but not with enough water to maintain constant flow. There are deep holes in the bed of the arroyo where water appears to be permanent, or to persist for long periods. It was in one such pool that this sample was taken. The pool was about 8m long, 3m wide, and 1m deep. All planarians taken were beneath one large rock (1/3m diameter) at the downstream end of the pool. Water was standing; no evidence of recent flow. Rock was buried in soft silt several cm. At this point, however, water temperature was a surprising 89 °F! This is a highly isolated locality surrounded by vast desert. We were very surprised to find planarians here.

Appendix. Two Polyclad Species from the Sea of Cortez, Baja California

No. 44. Lot. No. 1732. Polycladida sp. of Bahía Concepción (**photo 23**). Two specimens; whitish green and translucent above with an undulate body margin; with a pair of cerebral eye-spots; 20-22mm long and 12mm wide; fixed with Bouin's fluid. Loc.: Under small rocks on sand, about 1.5m beneath water, Playa Satispak, Bahía Concepción, Sea of Cortez, Baja California. Coll. R. & L. Mitchell; July 6, 1984.

No. 45. Lot. No. 1733. Polycladida sp. of Bahía de Los Angeles (**photo 24**). Three sexual specimens; very pale brown to translucent above; with a pair of cerebral eye-spots; 9-10mm long and 3-3.5mm wide; fixed with Bouin's fluid. Loc.: Under small rocks on sand, almost exposed at low tide, Bahía de Los Angeles, Sea of Cortez, Baja California Norte. Coll. R. & L. Mitchell, F. Abernethy; July 17, 1984.

5. Freshwater Planarians from Texas, U.S.A.: Additional Samples

No. 46. Lot No. 1214. *Girardia* sp. of Devil's River. Many, both sexual (a few) and asexual, specimens; brown above; 10-15mm long and 1-2.5mm wide; fixed with Bouin's fluid. Loc.: Devil's River, ca. 40km N of Comstock, Texas. Coll. Mitchell; Apr. 1, 1973.

No. 47. Lot No. 1215. *Girardia* sp. of Pecos River. Several asexual specimens; 10mm long and 1mm wide; fixed with Bouin's fluid. Loc.: Pecos River, ca. 42km N of Langtry, Val Verde Co., Texas. Coll. Mitchell; Apr. 15, 1973.

No. 48. Lot No. 1672. *Girardia* sp. of San Saba River (**photo 22**). Many sexual specimens; moderately brown above; 12-18 mm long and 2-2.5mm wide; fixed with Bouin's fluid; several cocoons were also obtained. Loc.: San Saba River, Menard, Menard Co., Texas. Coll. R. & L. Mitchell; Mar. 13, 1982.

No. 49. Lot No. 1878. *Girardia* sp. of Barton Spring. A single asexual specimen (broken); brown above; 10mm long and 1mm wide; fixed with 70% ethanol. Loc.: Barton Spring, Travis Co., near Austin, Texas. Coll. R. Hershler; Aug. 8, 1984. (Received from J. Reddell.)

No. 50. Lot No. 1879. *Girardia* sp. of Crockett. Two sexual specimens; brown above; 12-15mm long and 2-2.5mm wide; fixed with 70% ethanol. Loc.: A well of Crockett County, Texas. Coll. J. L. Ivy and L. K. Palit; Nov. 9, 1985. (Received from J. Reddell.)

No. 51. Lot No. 1880. *Phagocata?* sp. of Hondo Creek. A single asexual specimen; pale brown above with numerous dark brown pigments; 15mm long and 1mm wide; with 5 pharynges (protruded from the mouth); fixed with 70% ethanol. Loc.: Hondo Creek, Hyporheic Zone, Medina Co., ca. 6km E of Hondo, Texas. Coll. S. J. Harden; Apr. 21, 1986. (Received from J. Reddell.)

6. Land Planarians from México

No. 52. Lot No. 1207. Land Planaria sp. of Sótano del Rancho de la Barranca. A single preserved specimen; morphological data observed by Kawakatsu are under investigation. Loc.: Sótano del Rancho de la Barranca, 5km W of Ahuacatlán, San Luis Potosí. Coll. J. White; Nov. 27, 1972. (Received from J. Reddell.)

Note. This sample was sectioned (sagittal sections of a head piece; transverse sections of a posterior part of the head piece; sagittal sections of the pharyngeal and postpharyngeal piece). The animal was in a non-sexual condition.

No. 53. Lot No. 1208. Land Planaria sp. of Huichihuayán. A single preserved specimen; morphological data observed by Kawakatsu are under investigation. Loc.: Under rock near Río Huichihuayan near Huichihuayan, San Luis Potosí. Coll. Mitchell; Feb. 21, 1973.

No. 54. Lot No. 1241. Land Planaria sp. of Actún Chacaljas. A single preserved specimen fixed with Bouin's fluid; morphological data observed by Kawakatsu are under investigation. Loc.: Near the entrance of Actún Chacaljas, near Muna, Yucatan. Coll. J. Reddell; Aug. 2, 1973.

No. 55. Lot No. 1242. Land Planaria sp. of Muna. A single preserved specimen fixed with Bouin's fluid; morphological data observed by Kawakatsu are under investigation. Loc.: Under rock in a plain at 1km S of Muna, Yucatan. Coll. Kawakatsu; Aug. 3, 1973.

No. 56. Lot No. 1441. *Bipalium kewense* Moseley, 1878? A single, asexual specimen; head rounded (slightly broken) with numerous small eyes; pale yellowish brown above with a middorsal, longitudinal stripe of a blackish purple coloration (preserved specimens); 25mm long and 2.5mm wide; fixed with 70% ethanol. Loc.: 2km W of Río Huichihuayán, San Luis Potosí. Coll. T. R. Mollhagen; Feb. 21, 1973.

Note. This sample is a bipaliid species with a pair of conspicuous blackish patterns at the neck. The lateral and marginal stripes are not conspicuous in this small, preserved specimen.

No. 57. Lot No. 1442. *Bipalium kewense* Moseley, 1878? A single, asexual specimen; a crescent-shaped head, a pair of blackish patterns at the neck and longitudinal stripes are conspicuous (preserved specimen); 50mm long and 5mm wide; fixed with 70% ethanol. Loc.: Ahuacatlán, Querétaro. Coll. W. Graham; Feb. 21, 1973.

No. 58. Lot No. 1443. *Diporodemus?* sp. of Linares-1. Three specimens; pale brown above with a conspicuous, middorsal longitudinal stripe (preserved specimen); 20-30mm long and 3-4mm wide; fixed with 70% ethanol. Loc.: 14km W of Linares, Nuevo León. Coll. J. W. Cooke; Mar. 9, 1973.

No. 59. Lot No. 1444. *Diporodemus?* sp. of Linares-2. A single specimen; pale brown above; without dorsal stripes (preserved specimens); 25mm long and 4mm wide; fixed with 70% ethanol. Loc.: The same with the Lot No. 1443. Coll. J. W. Cooke; Mar. 9, 1973.

No. 60. Lot No. 1445. *Diporodemus?* sp. of Cueva del Lencho Virgén. A single specimen; pale brown above with a middorsal longitudinal stripe (preserved specimen); 25mm long and 3.5mm wide; fixed with 70% ethanol. Loc.: Near the entrance of Cueva del Lancho Virgen, 10km SSW of Acatlán, Oaxaca. Coll. J. Reddell, R. Jameson, D. McKenzie and W. Elliott; Jan. 2-3, 1974.

No. 61. Lot No. 1446. *Bipalium kewense* Moseley, 1878? A single specimen without head (broken); pale brown above with 3 longitudinal stripes (a thin, middorsal one and a pair of rather wide lateral ones) (preserved specimen); 30mm long and 2.5mm wide; fixed with 70% ethanol. Loc.: Sótano del Pozo, Ahuacatlán, San Luis Potosí. Coll. C. Elliott; May 25, 1974.

No. 62. Lot No. 1447. *Diporodemus?* sp. of Actún Sabacá. A single specimen; pale brown above without stripes (preserved specimen); 10mm long and 1.5mm wide; fixed with Bouin's fluid. Loc. Near the entrance of Actún Sabacá, 6km S of Tekax, Yucatán. Coll. J. Reddell, D. McKenzie, S. Wiley, J. Andrews, and Mitchell; Dec. 4, 1977.

No. 63. Lot No. 1448. Geoplaninae sp. of Actún Sabacá. A single specimen; brown above; obtuse head with many, small, marginal eyes (preserved specimen); 20mm long and 4mm wide; fixed with Bouin's fluid. Loc.: The same with the Lot No. 1447. Coll. J. Reddell, D. McKenzie, S. Wiley, J. Andrews and Mitchell; Dec. 4, 1977.

No. 64. Lot No. 1699. *Diporodemus?* sp. of Sótano del Camino. A single, sexual specimen; brown above without stripes (preserved specimen); 25mm long and 4mm wide; fixed with 75% isopropyl alcohol. Loc.: Sótano del Camino, 13km N of Agua Buena, San Luis Potosí. Coll. A. Grubbs; Aug. 4, 1975.

No. 65. Lot No. 1700. *Bipalium kewense* Moseley, 1878? A single, asexual specimen; pale brown above with 3 longitudinal stripes (a thin, middorsal one and a pair of lateral ones) (preserved specimen); 35mm long and 3mm wide (strongly curved); fixed with 3% formalin solution. Loc.: Sótano de Guadalupe, 10km W of Aquismón, San Luis Potosí. Coll. D. Pate; Mar. 18, 1980.

Acknowledgements

Kawakatsu and Mitchell wish to thank those who assisted in the collection of Mexican planarians for many years --- their names are shown at the end of each lot of samples listed in the text. We especially appreciate the special assistance of Mitchell's family, James Reddell (Austin), William Elliott (Austin), and Francis Abernethy (Nacogdoches, Texas).

References (exclusive of Polyclads)

I. Introduction (with several taxonomic papers for scientific names of genera cited in the text)

Ball, I. R., 1974. See the References II. Genera *Dugesia* s.s. Girard, 1850; *Girardia* Ball, 1974.

Girard, C., 1850. A brief account of the fresh water species of Planariae inhabiting the United States. Proc. Boston Soc. Nat. Hist., 3: 264-265. Genus *Dugesia* Girard, 1850.

Hirano, M. & Kawakatsu, M., 1983*. Freshwater algae from the Southern United States and México. I: Diatoms. Bull. Fuji Women's College, (21), II: 113-134 (pls. I-X).

Hirano, M. & Kawakatsu, M., 1984*. Freshwater algae, etc. II. Blue-green algae and desmids. Bull. Fuji Women's College, (22), II: 29-33 (pl. I).

* These freshwater algal samples from México were collected by Kawakatsu in the summer of 1973. The collecting sites of algae (and planarians) are shown in the sketch-map on p. 115 of the 1983 paper; 4 photos showing localities in Texas and México are shown in pl. I on p. 125.

Hyman, L. H., 1938. See the References IV. Genus *Diporodemus* Hyman, 1938.

Kawakatsu, M. & Mitchell, R. W., 1981a, b, 1984a. See References II.

Kawakatsu, M. & Mitchell, R. W., 1983, 1984b. See References III.

Kawakatsu, M., Murayama, H. & Ôgawara, G., 1995a. A list of triclad Turbellarians from Australia (including Tasmania) and New Zealand in Kawakatsu's Collection. Part I: A list with maps showing localities. Bull. Fuji Women's College, (33), II: 87-103.

Kawakatsu, M., Murayama, H. & Ôgawara, G., 1995b. A list of triclad Turbellarians, etc. Part II: Plates. Occ.

- Publ., Biol. Lab. Fuji Women's College, Sapporo (Hokkaidô), Japan, (26): 1-12 (pls. I-XI).
- Kawakatsu, M., Yoneda, I. & Murayama, H., 1996a. A List of triclad Turbellarians from Nepal in Kawakatsu's Collection. Part I: A list with maps. Bull. Fuji Women's College, (34), II: 95-103.
- Kawakatsu, M., Yoneda, I. & Murayama, H., 1996b. A list of triclad Turbellarians, etc. Part II: Additional maps and photographs. Occ. Publ., Biol. Lab. Fuji Women's College, Sapporo (Hokkaidô), Japan, (28): 1-4.
- Leidy, J., 1847. Description and anatomy of a new and curious sub-genus of *Planaria*. Proc. Acad. Nat. Sci. Philad., 3: 248-251. Genus *Phagocata* Leidy, 1847.
- Mitchell, R. W. & Kawakatsu, M., 1972a, 1973. See References II.
- Mitchell, R. W. & Kawakatsu, M., 1972b. See References III.
- Sluys, R. & Kawakatsu, M., 2000. New, southernmost record of *Paucumara trigonocephala* (Platyhelminthes, Tricladida, Maricola) from Queensland, with documentation of earlier records from Japan. Queensland Natur., 38 (1-3): 24-30.*
- * In "References" on page 30, a confusion occurred for the arrangement and citation of 3 papers. For their correct citations, see the following web article by Kawakatsu & Sasaki (2002), pages 4-5. <http://planarian.net/kswp/36/kaburaki.pdf>
- Sluys, R., Kawakatsu, M. & Winsor, L., 1998. See References II.
- Stimpson, W., 1857. Prodrum descriptiones animalium evertibratorum quae in Expeditione ad Oceanum, Pacificum, Septentrionalem a Republica Federata missa, Johanne Rodgers Duce, observavit et descripsit. Proc. Acad. Nat. Sci. Philad., 9: 19-31. Genus *Bipalium* Stimpson, 1857.
- Strand, E., 1942. Miscellanea nomenclatoria zoologica et palaeontologica. Folia Zool. Hydrobiol., 11: 386-402. Genus *Cura* Strand, 1942.

II. Paludicolen Freshwater Planarians (Tricladida, Paludicola) from México Previously Reported

- Ball, I. R., 1971. Systematic and biogeographical relationships of some *Dugesia* species (Tricladida, Paludicola) from Central and South America. Amer. Mus. Novitates, (2472): 1-25.
- Ball, I. R., 1974. A contribution to the phylogeny and biogeography of the freshwater triclads (Platyhelminthes: Turbellaria). In: Riser, N. W. & M. P. Morse (eds.), The Hyman Memorial Volume --- Biology of the Turbellaria, pp. 339-401. McGraw-Hill Book Co., New York, etc.
- Benazzi, M., 1972. Notizie preliminari sulle planarie raccolte nella seconda spedizione Lincea in Messico. Atti Accad. Naz. Lincei, 1972, Rend. Classe di Sci. fisic., matem. e nat., LII, (3): 403-405.
- Benazzi, M. & Giannini, E., 1971. *Cura azteca*, nuova specie di planaria del Messico. Atti Accad. Naz. Lincei, 1971, Rend. Classe di Sci. fisic., matem. e nat., L, (4): 477-481 + pls. I-II.
- Kawakatsu, M. & Mitchell, R. W., 1981a. An additional note on *Dugesia guatemalensis* Mitchell et Kawakatsu (Turbellaria, Tricladida, Paludicola), a troglomorphic planarian from México. Jour. Speleol. Soc. Japan, 6: 37-41.
- Kawakatsu, M. & Mitchell, R. W., 1981b. Freshwater planarians from the Southern United States and México: *Dugesia dorotocephala* and *Dugesia* sp. (Turbellaria, Tricladida, Paludicola). Annot. Zool. Japon., 54: 191-206.
- Kawakatsu, M. & Mitchell, R. W., 1984a. Redescription of *Dugesia azteca* (Benazzi et Giannini, 1971) based upon the material collected from the type locality in Mexico, with corrective remarks (Turbellaria, Tricladida, Paludicola). Bull. Nat. Sci. Mus., Tôkyô, ser. A (Zool.), 10: 37-50.
- Kawakatsu, M. & Mitchell, R. W., 1984b. Occurrence of *Dendrocoelopsis americana* (Hyman, 1939) in Soda Water Well, Texas, U.S.A. (Turbellaria, Tricladida, Paludicola). Proc. Jap. Soc. Syst. Zool., (28): 1-11 + pls. I-III.
- Kenk, R., 1974. Index of the genera and species of the freshwater triclads (Turbellaria) of the world. Smith. Contr. Zool., (183): i-ii + 1-90.
- Mitchell, R. W. & Kawakatsu, M., 1972a. Freshwater cavernicole planarians from Mexico: New troglomorphic and troglomorphic *Dugesia* from caves of the Sierra de Guatemala (1). Ann. Spéleol., 27, (4): 639-681.
- Mitchell, R. W. & Kawakatsu, M., 1973. A new cave-adapted planarian (Tricladida, Paludicola, Planariidae) from Chiapas, Mexico. Mitchell, R. W. & J. R. Reddell (eds.), Association for Mexican Cave Studies, Bull. 5: 165-170.
- Sluys, R. & Kawakatsu, M., 2001. Contribution to an inventory of the freshwater planarians of Australia and New Zealand (Platyhelminthes, Tricladida, Dugesiidae), with distribution maps of the species examined. Beaufortia, Bull. Zool. Mus., Univ. Amsterdam, 51 (10): 163-198.
- Sluys, R., Kawakatsu, M. & Winsor, L., 1998. The genus *Dugesia* in Australia, with its phylogenetic analysis and

historical biogeography (Platyhelminthes, Tricladida, Dugesiidae). Zool. Scripta, 27: 273-289.

Woodworth, W. McM., 1897. Contributions to the morphology on the Turbellaria. II. On some Turbellaria from Illinois. Bull. Mus. Comp. Zool. Harvard, 31: 1-16 + pl. 1.

III. Cavernicole Freshwater Planarians (Tricladida, Cavernicola) from México Previously Reported

Benazzi, M., 1972. See the References II.

Bennazi, M., 1973. Priority of the name *Opisthobursa mexicana* Benazzi, 1972 over *Dimarcus villalobosi* Mitchell and Kawakatsu, 1972. Atti Accad. Naz. Lincei, 1973, Rend. Classe di Sci., matem. e nat., LIV, (1): 133-134.

Bennazi, M., 1976. *Opisthobursa josephinae*, a new troglobitic planarian from Chiapas, Mexico. Atti Accad. Naz. Lincei, 1975, Rend. Classe di Sci., matem. e nat., LIX, (5): 533-536 + pls. I-II.

Bennazi, M. & Giannini, E., 1973. A remarkable cave planarian: *Opisthobursa mexicana* Benazzi, 1972. Accad. Naz. Lincei, 1973, (171): 47-54 + pls. I-IV.

Kawakatsu, M. & Mitchell, R. W., 1983. Record of a cave-adapted planarian (Turbellaria, Tricladida, Maricola) from Guatemala. Annot. Zool. Japon., 56: 291-298.

Kawakatsu, M. & Mitchell, R. W., 1984b. A list of retrobursal Tricladids inhabiting freshwater and aquatic probursal Tricladids regarded as marine relicts, with corrective remarks on our 1984 paper published in Zoological Science, Tôkyô. Occ. Publ., Biol. Lab. Fuji Women's College, Sapporo (Hokkaidô), Japan, (11): 1-8.

Mitchell, R. W. & Kawakatsu, M., 1972b. A new family, genus and species of cave-adapted planarian from Mexico (Turbellaria, Tricladida, Maricola). Occ. Pap., Mus. Texas Tech. Univ., (8): 1-16.

Sluys, R., 1990. A monograph of the Dimarcusidae (Platyhelminthes, Seriata, Tricladida). Zool. Scripta, 19. (1): 13-29.

IV. Land Planarians (Tricladida, Terricola) from México

Hyman, L. H., 1938. Land planarians from Yucatan. In: Pearse, A. S. (ed.), Fauna of the caves of Yucatan. Carnegie Inst. Washington Publ., (491): 23-32.

Hyman, L. H., 1939. New species of flatworms from North, Central, and South America. Proc. U. S. Nat. Mus., 86 (3055): 419-439.

Ogren, R. E. & Kawakatsu, M., 1998. American Nearctic and Neotropical land planarian (Tricladida: Terricola) faunas. Pedobiologia, 42: 441-451.

Ogren, R. E., Kawakatsu, M. & Froehlich, E. M., 1997*. Additions and corrections of the previous land planarian indices of the world (Turbellaria, Seriata, Tricladida, Terricola). Addendum IV. Geographic locus index: Bipaliidae; Rhynchodemidae (Rhynchodeminae; Microplaninae); Geoplanidae (Geoplaninae; Caenoplaninae; Pelmatoplaninae). Bull. Fuji Women's College, (35), II: 63-103 (Appendix I-V).

* Known species of Mexican land planarians are listed in this article.

Moseley, Description of a new species of land-planarian from the hothouses at Kew Gardens. Ann. Mag. Nat. Hist., (5), 1: 237-230.

V. Data Base

Roth, J., 2001a. Bibliography of Cave and Aquatic Interstitial Species North of Mexico. In: Draft Database on Caves of the US and Canada (CD-ROM). Oregon Caves Nat. Monument, Nat. Park Service, US Department of Interior. Contact: Dr. John Roth (E-mail: ORCA_Resource_Managemanet@nps.gov).

Roth, J., 2001b. Subterranean Species of the US and Canada (CD-ROM). Oregon Caves Nat. Monument, etc. The section 'Turbellaria (=flatworms in part)' was written by Dr. R. Sluys.

Tyler, S & Bush, L. F., 1998. Turbellaria Platyhelminthes. Turbellarian Taxonomic Database. <http://linius.umesci.maine.edu/turbellaria/index.html>

Note. The following web article is available for the study of "Turbellarians".

Kawakatsu, M., Takai, M. & Sasaki, G.-Y., 2001. Planarian Resources on the Web: English Version. http://www2u.biglobe.ne.jp/~gen-yu/plaweb_e.html

Explanation of Photos

*These photos were reproduced from Dr. Mitchell's color transparencies.

Photo 1, *Girardia* sp. of San Luis Potosí (Lot No. 1220); **photos 2 and 3**, *Girardia* sp. of San Juan del Río (Lot No. 1221) and its locality (Robert Mitchell Jr.); **photo 4**, *Girardia* sp. of near Tula (Lot No. 1222); **photo 5**, *Girardia* sp. of Presa Tejocotal; **photo 6**, *Girardia* sp. of Vega do Alatorre-1 (Lot No. 1226); **photo 7**, *Girardia* sp. of Vega do Alatorre-2 (Lot No. 1227); **photos 8 and 9**, *Girardia* sp. of Tierra Blanca (Lot No. 1228); **photo 10**, *Girardia* sp. of Parenque-1 (Lot No. 1229); **photo 11**, *Girardia* sp. of Palenque-2 (Lot No. 1233); **photo 12**, *Girardia* sp. of Palenque-6 (Lot No. 1234); **photo 13**, *Girardia* sp. of Kabachén (Lot No. 1235); **photo 14**, *Girardia* sp. of Tamazulapan (Lot No. 1239).

Photos 15–19, *Girardia azteca* (Benazzi et Giannini, 1971) (Lot No. 1240). The type locality (**photo 15** -- from the back to the front --, Kawakatsu, Mitchell Jr. and Mitchell). Animals (**photos 16 and 17**) and cocoons (**photos 18 and 19**).

Photo 20, *Girardia* sp. of Arroyo San Vicente (Lot No. 1730); **photo 21**, *Girardia* sp. of Arroyo Parras (Lot No. 1731).

Photo 22, *Girardia* sp. of San Saba River (Lot No. 1672) and a cocoon (middle-left).

Photo 23, Polycladida sp. of Bahía Concepción (Lot No. 1732); **photo 24**, Polycladida sp. of Bahía de Los Angeles (Lot No. 1733).

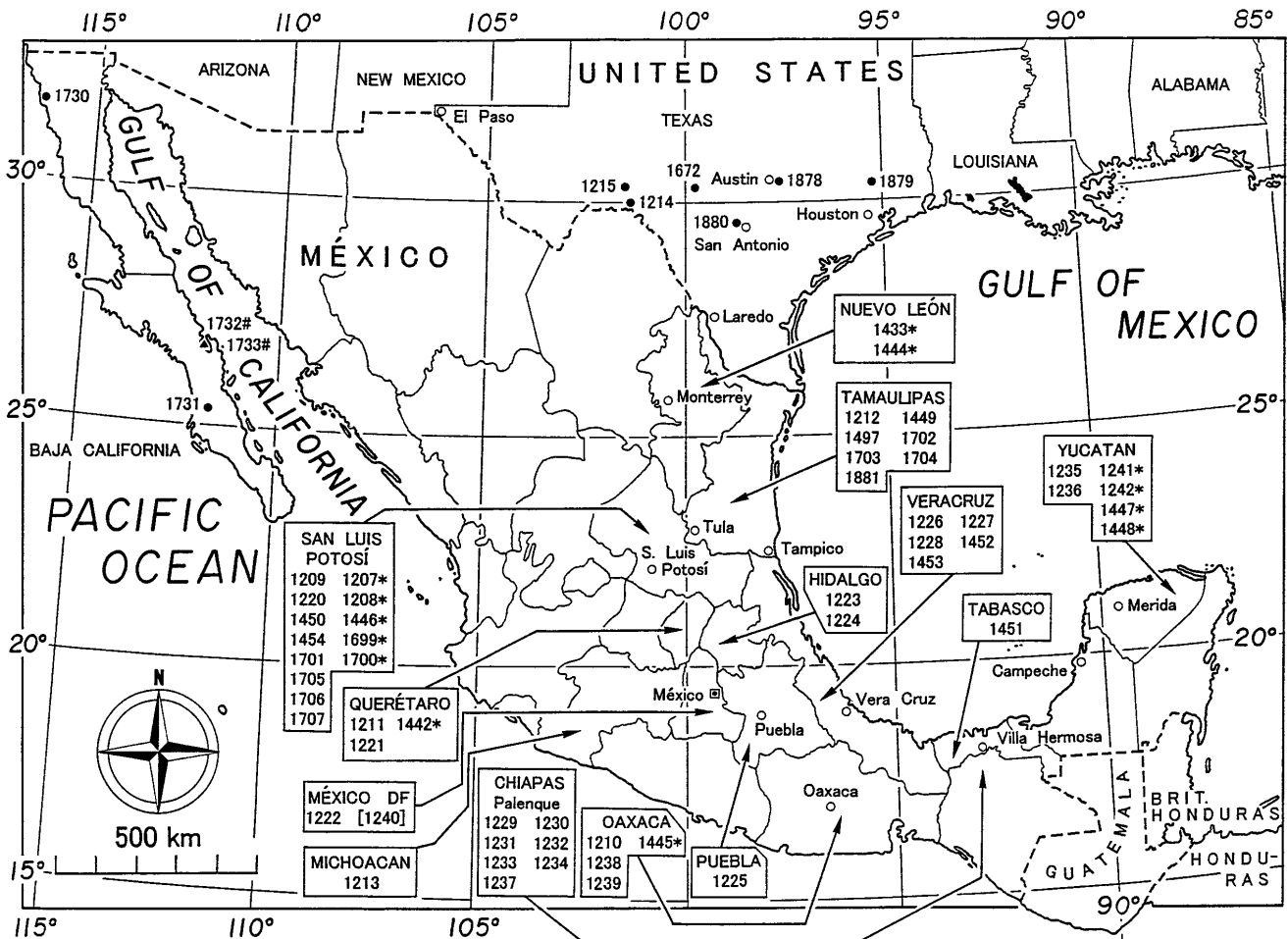


Fig. 1. Sketch map of Southern Texas, U.S.A., and México showing general collecting sites of planarians. The samples obtained are shown by Kawakatsu's Specimen Lot Numbers. In Baja California in México and Texas, localities are shown by each Lot No. of samples on the map: freshwater planarians (●); polyclads (▲, Lot Nos. with #).

In the other areas of México, Lot Nos. and the name of Provinces where samples were collected are shown: freshwater planarians (normal numbers except for *Girardia azteca* [1240]); land planarians (Lot Nos. with *).