



Fig. 20. Geographical distributions of the Japanese species of *Pylopaguopsis*. 1, Sagami Bay; 2, Oh-shima Island; 3, Hachijyo-jima Island; 4, Ogasawara Islands; 5, Kii Peninsula; 6, off Tosa; 7, off Tosashimizu; 8, Tsushima Islands; 9, 10 East China Sea; 11, Okinawa-honto Island; 12, Kerama Group; 13, Kume-jima Island. *Pylopaguopsis zebra*: 1, 5, 6, 7, 8; *P. speciosa*: 5, 11, 13; *P. keijii*: 13; *P. fimbriata*, 12, 13; *P. laevispinosa*: 5, 11; *P. furusei*: 2, 3, 4; *P. granulata*: 13. 1, 8, 9, 10: data from Miyake (1978); 11: data from McLaughlin & Haig (1989).

Etymology.—The specific name is from the Latin *granulatus* reflecting the highly granular condition of right chela in this species.

Affinities.—In the morphological similarity of the right and left third pereopods, *Pylopaguropsis granulata* new species belongs to the *teevana* group. This new species differs from all the other members of the group in the following combination of characters: the shield is laterally expanded and its anterolateral margins are angular; the antennal acicles are unusually long, overreaching the corneas; the dorsal face of the palm of the right cheliped is extremely granular, sometimes tuberculate, and its mesial face is armed with a row of widely-spaced, very strong spines; dorsal faces of the propodi of the ambulatory legs each has a row of protuberances; the posterior lobes of the telson have nearly unarmed horizontal terminal margins. No other species of the group has such a combination of characters.

Distribution.—Known only from the type locality; 10 m.

Distribution

Among the Japanese species of *Pylopaguropsis*, *P. zebra* is the most widely distributed among the Japanese species, recorded from both the Pacific Ocean and the Sea of Japan, mainly from the warm temperate regions (Fig. 20). *Pylopaguropsis laevispinosa* is also found in the warm temperate Kii Peninsula but is also distributed in tropical Okinawa. Distribution of *P. furusei* at present is restricted to the Izu-Ogasawara Arc. The other four species, *P. keijii*, *P. fimbriata*, *P. speciosa*, and *P. granulata* are found in the coral reefs of Okinawa (Fig. 20).

Pylopaguropsis zebra is found in deeper waters (50–180 m), and *P. laevispinosa* is also recorded from moderately deep waters (50–80 m). Shallow water distributions are exhibited by *P. keiji*

(10–17 m), *P. fimbriata* (10–20 m), *P. granulata* (10 m) *P. furusei* (3–30 m) as well as *P. speciosa* (10–61 m).

Acknowledgements

This work was started by a gift of the hermit crab specimens collected by and their color photographs taken by Keiichi Nomura (Kushimoto Marine Park Center, Wakayama) from the Kerama Group, Okinawa. It was carried out as a part of the research project "Ecological survey of animals of Yakani-jima Island, Ryukyu Archipelago" supported by the World Wide Fund for Nature Japan. Thanks are due to Koji Furuse (Hachijyo-jima Visitor Center), Hiroyuki Tachikawa (Coastal Branch of Natural History Museum and Institute, Chiba), Show Hirayama (Shizuoka), Hideyuki Takasu (Hachijyo-jima) and Yuishow Sakamoto (Okinawa) for making material and color photographs available for study. I owe a special debt of gratitude to Dr. Patsy A. McLaughlin who made elaborate and careful reviews on the manuscript and for discussion on gill structures of *Pylopaguropsis*. Comments by Dr. Rafael Lemaitre (USNM), Paul F. Clark (NHM), and K. Nomura (KMPC) greatly improved the manuscript. My thanks are also extended to P. F. Clark and M. Lowe (NHM), R. Lemaitre, Ryouhei Yamanishi (OMNH), and Yoshitaka Yabumoto (Kitakyushu Museum of Natural History) for arranging loans or facilitating access to material of *Pylopaguropsis* in their respective museums or institutions. I also thank Roy T. Tsuda, Robert T. Richmond, Berry D. Smith, and Richard H. Randall for their hospitality while in the University of Guam Marine Laboratory, and R. F. K. Memorial Library for access to Wooster's master thesis and material.

Literature Cited

Alcock, A., 1905., Catalogue of the Indian decapod Crustacea in the collections of the

- Indian Museum. Part II. Anomura. Fasc. I, Pagurides. xi + 197 pp., 16 pls., Indian Museum, Calcutta.
- Asakura, A., 1995. Infraorder Anomura. In: S. Nishimura (ed.), Guide to Seashore Animals of Japan with Color Pictures and Keys. II. Hoikusha, Osaka, 347–378. (In Japanese)
- Baba, K., 1982. Galatheids and pagurids of the Palau Islands (Crustacea: Anomura). Proceedings of the Japanese Society of Systematic Zoology, 23: 56–70.
- Boone, L., 1932. The littoral crustacean fauna of the Galapagos Islands. Part 2. Anomura. Zoologica, New York, 14: 1–62.
- Edmondson, C. H., 1925. Marine zoology of tropical central Pacific: Crustacea (Tangier Expedition, publication number 1). Bernice Bishop Museum Bulletin, 27: 3–62.
- , 1933. Reef and shore fauna of Hawaii. Special Publication of the Bernice Bishop Museum, 22: 226–228.
- , 1946., Reef and shore fauna of Hawaii (revised edition). Special Publication of the Bernice Bishop Museum, 22: i–iii, 1–381.
- Haig, J., & Ball, E. E., 1988. Hermit crabs from north Australian and eastern Indonesian waters (Crustacea Decapoda: Anomura: Paguroidea) collected during the 1975 *Alpha Helix* Expedition. Records of the Australian Museum, 40: 151–196.
- Henderson, J. R., 1893. A contribution to Indian carcinology. Transactions of the Linnean Society of London, series 2, Zoology, 5: 325–458, pls. 36–40.
- , 1896. No. 24. Report on the Paguridae collected during the season 1893–94. Natural history notes from H. M. 'Investigator' Commander C. F. Oldham, R. N., commanding — Series II. Journal of the Asiatic Society of Bengal, 65: 516–536.
- Hogarth, P. J., Gherardi, F., & McLaughlin, P. A., 1998. Hermit crabs of the Maldives, with the description of a new species of *Catapagurus*. Tropical Zoology, 11: 149–175.
- Latreille, P. A., 1803. Histoire naturelle, générale et particulière, des Crustacés et des Insectes, volume 3. 467 pp. Paris.
- Lemaitre, R., 1995. A review of the hermit crabs of the genus *Xylopagurus* A. Milne Edwards, 1880 (Crustacea: Decapoda: Paguridae), including description of two new species. Smithsonian Contributions to Zoology, 570: 1–27.
- McLaughlin, P. A., 1974. The hermit crabs (Crustacea, Decapoda, Paguridae) of northwestern North America. Zoologische Verhandlungen, 130: 1–396.
- , 1997. Crustacea Decapoda: Hermit crabs of the family Paguridae from the KARUBAR Cruise in Indonesia. In: Crosnier, A., & Bouchet, P., (eds.), Résultats des Campagnes MUSORSTOM, volume 16. Mémoires du Muséum national d'Histoire naturelle, Paris, 172: 433–572.
- , & Haig, J., 1989. On the status of *Pylopaguroopsis zebra* (Henderson), *P. magnimanus* (Henderson), and *Galapagurus teevanus* Boone, with descriptions of seven new species of *Pylopaguroopsis* (Crustacea: Anomura: Paguridae). Micronesica, 22: 123–171.
- , & de Saint Laurent, M., 1998. A new genus for four species of hermit crabs formerly assigned to the genus *Pagurus* Fabricius (Decapoda: Anomura: Paguridae). Proceedings of the Biological Society of Washington, 111: 158–187.
- Miyake, S., 1975. Anomura. In: Utinomi, F., (ed.), Aquatic Animals in Color. Gakushu Kenkyusha, Tokyo, 110–119.
- , 1978. The Crustacean Anomura of Sagami Bay. Biological Laboratory, Imperial Household, Tokyo, 200 pp. + 4 pls.
- , 1982. Japanese crustacean decapods and stomatopods in color. I. Macrura, Anomura and Stomatopoda. 261 pp. Hoikusha, Osaka. (In Japanese)
- , & Imafuku, M., 1980. Hermit crabs from Kii Peninsula. Nankiseibutsu, the Nanki Biological Society, 22: 1–7, 59–64.
- Nomura, K., Nagai, S., Asakura, A., & Komai, T., 1996. A preliminary report of shallow water decapod Crustacea in the Kerama Group, the Ryukyu Archipelago. Bulletin of the Biogeographical Society of Japan, 51: 7–21.
- Rahayu, D. L., 1994. Hermit crabs (Crustacea: Decapoda: Diogenidae, Paguridae) of Kotania Bay, Seram Island, Maluku, Indonesia. Perairan Maluku dan Sekitarnya, 7: 73–90.
- Saint Laurent-Dechancé, M. de., 1966. Remarques sur la classification de la famille des Paguridae et sur la position systématique d'*Iridopagurus* de Saint Laurent. Diagnose d'*Anapagurides* gen. nov. Bulletin du Muséum National d'Histoire Naturelle, série 2, 38: 257–265.
- Wooster, D. S., 1979. The shallow-water hermit crabs of the Mariana Islands (Decapoda, Paguroidea: Coenobitidae, Diogenidae, Paguridae). Master's thesis,

University of Guam, 180 pp. (unpublished)

Address: Natural History Museum and In-

stitute, Chiba, 955-2, Aoba-cho, Chuo-ku,
Chiba 260-8682, Japan

E-mail: asakura@chiba-muse.or.jp.