THE TAXONOMIC STATUS OF THE INTRODUCED NORTH AMERICAN SIGNAL CRAYFISH, *Pacifastacus leniusculus* (DANA, 1852) IN JAPAN, AND THE SOURCE OF SPECIMENS IN THE NEWLY REPORTED POPULATION IN FUKUSHIMA PREFECTURE

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ABSTRACT

An alien crayfish, *Pacifastacus leniusculus* (Dana, 1852), was introduced in Japan from North America, and populations have survived in Hokkaido and Shiga Prefecture. Detailed morphological analyses suggested that the subspecific division in *P. leniusculus* that was previously proposed in the U. S. A., is not consistent in the Japanese populations, because intermediate and overlapping subspecific diagnostic characters were frequently found. Recently, *P. leniusculus* was illegally introduced into Fukushima Prefecture, Japan. In order to track down the origin of the new population, the detailed morphology of the *P. leniusculus* specimens as well as the species composition of their ectosymbiotic crayfish worms (Annelida, Clitellata, Branchiobdellidae) were examined and compared with those in two previously introduced populations in Hokkaido and Shiga Prefecture. Crayfish from Hokkaido and Fukushima Prefecture have a relatively long rostrum that differs from that found on specimens from Shiga Prefecture. In addition, the crayfish worm, *Sathodrilus attenuatus* Holt, 1981, occurs only in the Hokkaido and Fukushima Prefecture populations, thus suggesting the crayfish in Fukushima were introduced from Hokkaido. The shape of the rostrum and the presence of the crayfish worm can be used as tools for tracing the spreading of introduced *P. leniusculus* in Japan.

RÉSUMÉ

Une écrevisse étrangère, *Pacifastacus leniusculus* (Dana, 1852) a été introduite au Japon en provenance de l’Amérique du Nord et des populations ont survécu dans les préfectures d’Hokkaido et de Shiga. Une analyse morphologique détaillée suggère que la division en sous-espèces de *P. leniusculus*, précédemment proposée aux U.S.A., n’est pas justifiée pour les populations du Japon, parce que des caractères diagnostiques subspecifiques intermédiaires y ont été trouvés. Récemment, *P. leniusculus* a été illégalement introduitée dans la préfecture de Fukushima, au Japon. Afin de retrouver l’origine de cette nouvelle population, la morphologie détaillée des spécimens de *P. leniusculus* ainsi que la composition spécifique de leurs ectosymbiotes (Annelida, Clitellata, Branchiobdellidae) ont été examinées et comparées à ceux des populations précédemment introduites dans les préfectures.
de Hokkaido et de Shiga. Les écrevisses d’Hokkaido et de Fukushima ont un rostre relativement long qui diffère de celui des écrevisses de Shiga. De plus, le symbiote Sathodrilus attenuatus Holt, 1981 n’est présent que dans les populations d’Hokkaido et de Fukushima, ce qui suggère donc que les écrevisses de Fukushima proviendraient d’Hokkaido. La forme du rostre et la présence du ver ectosymbiotique ci-dessus signalé peuvent être utilisés comme outils pour repérer la propagation des P. leniusculus introduites au Japon.

INTRODUCTION

The signal crayfish, Pacifastacus leniusculus (Dana, 1852), has been recognized to comprise three subspecies (Miller & Van Hyning, 1970): P. l. leniusculus (Dana, 1852), P. l. trowbridgii (Stimpson, 1857), and P. l. klamathensis (Stimpson, 1857), but this subdivision has been questioned for introduced populations (Riegel, 1959). Pacifastacus leniusculus was introduced in Japan from North America, and populations have survived to date in Shiga Prefecture and Hokkaido (Miyake, 1982). The taxonomic status of the Japanese P. leniusculus is examined herein.

There is a possibility that the recent decline of the Japanese native crayfish, Cambaroides japonicus (De Haan, 1841), has occurred due to interspecific competition with P. leniusculus (cf. Nakata & Goshima, 2003) and/or by harmful effects of the crayfish plague, Aphanomyces astaci Schikora, 1903, brought in with that introduced crayfish (Unestam, 1969).

A new population of P. leniusculus was found in Fukushima Prefecture, northern Japan, in 2001. No records have been found indicating when these crayfishes were released, or where they originated from (Nakatani & Yokoyama, 2003). In order to ensure the future survival of the native crayfish in Japan by preventing illegal introduction, this study aims at clarifying the origin of the new population of P. leniusculus in Fukushima Prefecture, based on external morphology and the presence or absence of associated crayfish worms (Annelida, Clitellata, Branchiobdellidae).

MATERIALS AND METHODS

A total of 75 (30 from Hokkaido, 30 from Fukushima, and 15 from Shiga) specimens of Pacifastacus leniusculus were observed in this study. Field collections in Hokkaido and Fukushima Prefecture (fig. 1) were made by hand. Similar body sizes, number, and fractions of both sexes were collected in the samples to eliminate the influence of body size and sexual difference. Also, voucher museum specimens collected earlier from Shiga Prefecture were examined (fig. 1). Localities and other details are as follows: 15 males and 15 females from Obihiro City, Hokkaido, 16 August, 2002 (now housed in Hirosaki University); 15 males and 15 females