



New species of the snake eels *Echelus* and *Ophichthus* (Anguilliformes: Ophichthidae) from Taiwan

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Abstract

Three new species of ophichthid eels, subfamily Ophichthinae, are described and illustrated from specimens collected at fish markets in Taiwan. Included are: *Echelus polyspondylus* sp. nov., which is unique in its vertebral number (172–183), dorsal-fin origin (behind gill openings), and coloration (anal-fin membrane black posteriorly); *Ophichthus bicolor* sp. nov., which is unique in its mean vertebral formula (18-64-158), dorsal-fin origin (well behind gill openings), dentition (teeth large and conical), and contrasting coloration (tan dorsally, white ventrally); and *O. shaoi* sp. nov., which is unique in its mean vertebral formula (11-69-159), and prominent lip barbels. A key to Taiwanese species of *Echelus* and *Ophichthus* is provided.

Key words: Taxonomy, Pisces, Teleostei, Ophichthidae, new species

Introduction

Knowledge of the worm eels and snake eels of the family Ophichthidae has increased dramatically in this century. Chen & Weng's (1967) seminal study of the *Apodal Fishes of Taiwan* listed 15 species distributed among 9 genera. More recently, The Taiwan Fish Database (Shao, 2015) increased that number to 44 species among 19 genera (subsequent taxonomic decisions would reduce that number to 41 species among 18 genera). The comprehensive work of ichthyologists and their students have now increased that list of ophichthids to at least 61 species and 23 genera (McCosker *et al.*, in preparation). In preparation for the upcoming publication of a treatise on the anguilliform fishes of Taiwan we are herein describing a new species of *Echelus* and two new species of *Ophichthus* for the chapter on the family Ophichthidae.

The Ophichthidae is the largest of anguilliform families, possessing more than 270 species distributed among 60 genera. Many of the genera have been revised during the last four decades, however several large and complex genera are still problematic and none more so than *Ophichthus*. It is a polyphyletic assemblage with more than 70 species and numerous subgenera. The closely related genus *Pisodonophis* is also polyphyletic and several of its species differ from species of *Ophichthus* only in minor dental conditions. The species of *Ophichthus* and *Echelus* can be differentiated from other members of the tribe Ophichthini (*sensu* McCosker, 1977) in their general morphology; they are generalized in their cephalic appearance (lacking shortened or elongated snouts), their dentition (sharp, but lacking extremely minute or elongated teeth), their pectoral fin condition (neither extremely shortened nor elongated), and their body elongation (most are moderately elongate). They differ from each other primarily in the condition of their caudal fin.

Too few ophichthids have been examined on the basis of their genomic characters, and that will undoubtedly shed light on familial phylogeny. Many ophichthid species are known only from the single holotypes which were formalin-preserved and are now useless for DNA analysis. Much work remains to be done before a worldwide revision of the family is possible.