A new species of rainbowfish (*Melanotaenia*: Melanotaeniidae), from the Lakekamu Basin, Papua New Guinea

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Abstract

A new species of melanotaeniid rainbowfish was collected by the author during a 1996 Conservation International survey of the Upper Lakekamu Basin in Papua New Guinea. *Melanotaenia sylvatica*, sp. nov. is described from 26 specimens, 31.7-55.0 mm SL, collected in forest creek and open riverine habitats at elevations between 35 and 120 m above sea level. It belongs to the "maccullochi group" of *Melanotaenia*, and appears to be most closely related to *M. ogilbyi* and *M. caerulea*. It differs from the other members on the basis of live colour pattern. It is most similar to *M. caerulea* and *M. ogilbyi*, but differs in the modal number of soft dorsal, anal, and pectoral rays.

Introduction

Rainbowfishes of the family Melanotaeniidae are common freshwater inhabitants of Australia and New Guinea. The group is believed to have evolved in relatively recent times from marine atherinoids (**Allen** 1980) and is closely related to the Pseudomugilidae (**Saeed** *et al.* 1989). **Allen** (1995) provided a popular account, including colour illustrations, and a summary of biological information for the 53 known species. Six genera are currently recognised: *Cairnsichthys, Chilatherina, Glossolepis, Iriatherina, Melanotaenia* and *Rhadinocentrus*. *Melanotaenia*, with 42 described species, is by far the largest genus. Table 1 provides a summary of the species in this genus and their general distributions.

Rainbowfishes are exceptionally abundant throughout their distributional range. Clear, running streams and lakes are the preferred habitats, although they also occur in turbid waters, ponds, swamps, and isolated rocky pools in otherwise dry streambeds. Most species form loose aggregations, which swim either in midwater or just below the surface. The main dietary items include insects which fall onto the surface and micro-crustaceans. Spawning occurs year round in most species, but reproductive activity often peaks at the onset of rainy periods.

The present paper describes a new species of *Melanotaenia* that was collected during a Conservation International faunal survey in the Upper Lakekamu Basin of southeastern Papua New Guinea. The collection site is located approximately 150 km northwest of Port Moresby on the southern slope of the Central Dividing Range. Most of the basin is an extensive lowland alluvial plain over which the Lakekamu River and its tributaries meander. The collection sites were situated about 15-20 km above the Lakekamu River junction and 90-100 km upstream from the sea in the Sapoi River and its forest tributaries, close to the transition from lowland to mountainous terrain.

The methods of counting and measuring are as follows: *dorsal and anal rays* - the last ray of the anal and second dorsal fins is divided at the base and counted as a single ray; *lateral scales* - number of scales in horizontal row from upper corner of gill cover to caudal-fin base, excluding the small scales posterior to the hypural junction; *transverse scales* - number of scales in vertical row between anal fin origin and base of first dorsal fin; *predorsal scales* - number of scales along midline of nape in front of first dorsal fin; *cheek scales* - total number of scales covering the suborbital and preoperculum; *standard length (SL)* - measured from the tip of the upper lip to the caudal-fin base; *head length* - measured from the tip of the upper lip to the upper rear edge of the gill opening; *caudal peduncle depth* is the least depth and *caudal peduncle length* is measured between two vertical lines, one passing through the base of the last anal ray and the other through the caudal-fin base.

Counts and measurements that appear in parentheses refer to the range for paratypes if different from the holotype. Type specimens are deposited at the United States National Museum of Natural History, Washington, D.C. (USNM) and the Western Australian Museum, Perth (WAM). The holotype is being held in trust for the Government of Papua New Guinea.

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Fig. 1. - *Melanotaenia sylvatica*, male, paratype, 50.7 mm SL, Sapoi River, Papua New Guinea. **G.R. Allen**
Melanotaenia sylvatica, mâle paratype, 50,7 mm LS, Sapoi River, Nouvelle-Guinée Papouasie.

Melanotaenia sylvatica sp. nov.
(Figures 1-2)

Holotype. WAM P.31224-001, male, 55.0 mm SL, Sapoi River, small side channel about 4.5 km (straight-line distance) S of Ivimka Camp, 7°45.9'S, 146°29.0'E, elevation approximately 40 m, bottom mainly mud and sand with tree roots and logs, water clear and slow-flowing through open forest, depth to 1.0 m, 1 kg rotenone, **G. Allen**, 15 November 1996.

Paratypes. WAM P. 31224-002, 25 specimens, 31.7-50.6 mm SL, collected with holotype.

Description

Dorsal rays V-I,11 (IV to VI,9 to 11); anal rays I,16 (I,15 to 18); pectoral rays 12 (12 or 13); pelvic rays I,5; branched caudal rays 14 (14 or 15); lateral scales 35 (34 or 35); transverse scales 10 (10 or 11); predorsal scales 15 (14 to 16); cheek scales 11 (10 to 15); gill rakers on first arch 2+13 = 15 (2 or 3 + 12 or 13).

Body depth 3.0 (2.8-3.5), head length 3.8 (3.5-3.8), both in SL. Greatest width of body 2.9 (2.2-2.9) in greatest body depth. Snout length 3.2 (3.2 -3.8), eye diameter 2.9 (2.6 -3.3), interorbital width 2.9 (2.8-3.0), depth of caudal peduncle 2.3 (2.3-2.8), length of caudal peduncle 1.4 (1.4-1.5), all in head length.

Jaws about equal, oblique, premaxilla with an abrupt bend between the anterior horizontal portion and lateral part; maxilla ends anterior to front border of eye; lips thin; teeth conical with slightly curved tips, extending on to outer surface of lips; teeth of upper jaw in 4-5 irregular rows anteriorly, reduced to a single row posteriorly, where they are exposed when mouth is closed; teeth in lower jaw in about 6 irregular rows anteriorly, reduced to 1 or 2 rows posteriorly; narrow row containing several small, conical teeth on vomer and palatines.

Scales of body cycloid, relatively large, and arranged in regular horizontal rows; scale margins smooth or slightly crenulate margins; predorsal scales extending forward to rear margin of interorbital space; preopercle with 2 scale rows between its posterior angle and eye.

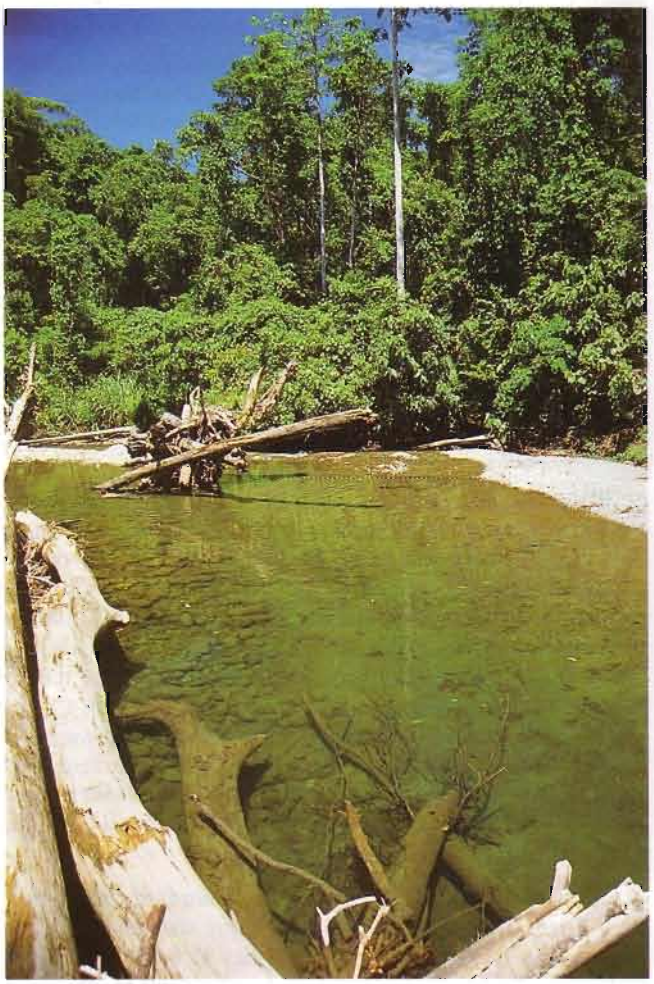

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Fig. 2. - Habitat of *Melanotaenia sylvatica,* Sapoi River, Papua New Guinea.

Fig. 3. - *Melanotaenia caerulea*, male paratype, 46.5 mm SL (WAM P.30966-001), pond near Kopi Chevron Camp, Papua New Guinea.
Melanotaenia caerulea, mâle paratype, 46.5 mm LS (WAP P.30966-001), mare près de Kopi Chevron Camp, Papua New Guinea.

Fig. 4. - *Melanotaenia ogilbyi*, male, 51.7 mm SL (WAM P.31057-010), near Timika, Irian Jaya.
Melanotaenia ogilbyi, mâle 51,7 mm LS (WAM P.31057-010), près de Timika, Irian Jaya.

First dorsal fin originates slightly in front of level of anal fin origin; longest spines (second to fourth) of first dorsal fin 1.5 (1.4-2.3) in head length, its depressed tip not reaching or barely reaching spine of second dorsal fin in females and reaching second or third soft ray in mature males. Longest rays (generally anterior ones in females and posterior ones in males) of second dorsal fin 1.7 (1.5-2.0) in head length, the depressed posterior rays extending less than one-half length of caudal peduncle in females and one-half to two-thirds length of caudal peduncle in mature males. Longest (middle rays in females, last 2 or 3 rays in males) anal rays 1.5 (2.0-2.2) in head length. Pelvic fin tips when depressed nearly reaching (females) or reaching slightly beyond (males) anal fin origin; length of pelvic fins 1.6 (1.7-2.1), of pectoral fins 1.7 (1.5-1.8), of caudal fin 1.2 (1.2-1.3), all in head length. Caudal fin moderately forked.

Colour in life: overall yellowish-bronze with narrow brownish-orange stripe between each scale row; greenish brown on upper back; midlateral row of scales on side grey to blackish, connected to similar coloured stripe extending from rear edge of eye; lower half of head and body silvery white, usually with variable duskiness associated with edge of scales on side of abdomen; dorsal and anal fins yellow to translucent bronze, grey near outer margin with fine white border; caudal fin clear or slightly grey; pelvic fins pale yellow; pectorals clear or with slight yellow tint.

Colour in alcohol: upper half of body brown, lower half tan to whitish; scales of body, particularly on upper half, with narrow dark outline; blackish midlateral stripe from preopercular margin to base of caudal fin, more intense in males; fins translucent to dusky grey, anterior edge of first dorsal fin and outer portion of second dorsal and anal fins sometimes dusky blackish, especially pronounced in males.

Sexual dimorphism: typical of most members of the genus; males are generally deeper bodied and have a more elongate, somewhat pointed shape posteriorly on the soft dorsal and anal fins. In addition, the depressed first dorsal fin of adult males overlaps the second dorsal fin in males, but falls short of this point or barely reaches it in females. The body depth (as percentage of the standard length) of 13 males, 31.5-55.0 mm SL, ranged from 30.2-35.5 with an average of 32.7; that of 13 females, 36.6-50.6 mm SL, was 27.8-31.3 with an average of 29.5. The smallest gravid female examined was 36.6 mm SL. The smallest male exhibiting secondary sexual characteristics (elongate first dorsal fin and pointed shape posteriorly of anal and second dorsal fins) was 31.5 mm SL. Judging from the growth rates of closely related members of the "mccullochi group" sexual maturity is reached before the end of their first year.

Distribution and habitat

The new species is currently known from altitudes between about 35 and 120 m in the Upper Lakekamu Basin of southeastern Papua New Guinea. Typical habitat consists of small (1-3 m wide), clear, slow-flowing creeks in closed-canopy forest over relatively flat terrain. These creeks typically have mud or gravel bottoms and are littered with leaves and log debris. One species of submerged aquatic plant, *Hydrostemma motleyi* (Nymphaeaceae), was common in many of the streams. The fish was most abundant in 0.5-1.0 m deep pools behind fallen logs or buttress roots of large trees. These streams typically possess a community consisting of relatively few fishes. In addition to *M. sylvatica*, there is usually another less common rainbowfish (*M. goldiei*), a plotosid catfish (*Neosilurus brevidorsalis*), a grunter (*Hephaestus trimaculatus*), a goby (*Glossogobius* sp.) and two gudgeons (*Oxyeleotris fimbriata* and *Mogurnda pulchra*).

In addition to the primary forest habitat, *M. sylvatica*, also occurs in the main Sapoi River (Fig. 2), below an altitude of about 50 m. Above this altitude, the river undergoes a relatively quick transition from a slow-flowing lowland stream to a mountain torrent. The riverine habitat of *M. sylvatica* consists of deeper (to 3 m), sand or gravel bottom pools, often behind log jams, either in shaded positions or in full sunlight. Two other species of rainbowfish, *M. goldiei* (abundant) and *M. rubrostriatus* (rare) share this habitat. Approximately 15 other species, including ariid and plotosid catfishes, garfish (Hemiramphidae), hardyheads (Atherinidae), grunters (Terapontidae), jungle perch (Kuhliidae), cardinalfish (Apogonidae), mullets (Mugilidae), gobies (Gobiidae), gudgeons (Eleotridae), and soles (Soleidae) inhabit this section of the river.

Table 1
List of the known species of the genus *Melanotaenia* Gill
and their general distribution.
Liste des espèces connues du genre *Melanotaenia* Gill
et leur répartition générale.

SPECIES	DISTRIBUTION
M. affinis (Weber, 1908)	widespread, N New Guinea
M. ajamaruensis Allen et Cross, 1980	Ayamaru Lakes, Irian Jaya
M. angfa Allen, 1990	E Bintuni Bay, Irian Jaya
M. arfakensis Allen, 1990	NE Vogelkop Peninsula, Irian Jaya
M. boesemani Allen et Cross, 1980	Ayamaru Lakes, Irian Jaya
M. caerulea Allen, 1996	Kikori R. system, Papua New Guinea
M. catherinae (De Beaufort, 1910)	Waigeo Island, Irian Jaya
M. corona Allen, 1982	Sermowai River, Irian Jaya
M. duboulayi (Castelnau, 1878)	SE Queensland & NE New So. Wales
M. eachamensis Allen et Cross, 1982	Atherton Tablelands, Queensland
M. exquisita Allen, 1978	No. West. Australia & No. Territory
M. fluviatilis (Castelnau, 1878)	Murray-Darling system, SE Australia
M. fredericki (Fowler, 1939)	Sorong district, Irian Jaya
M. goldiei (Macleay, 1883)	widespread, S New Guinea
M. gracilis Allen, 1978	Kimberley District, NW Australia
M. herbertaxelrodi Allen, 1981	Lake Tebera, Papua New Guinea
M. irianjaya Allen, 1985	Vogelkop Peninsula, Irian Jaya
M. iris Allen, 1987	Strickland R., Papua New Guinea
M. japenensis Allen et Cross, 1980	Yapen Island, Irian Jaya
M. kamaka Allen, 1996	Lake Kamaka, Irian Jaya
M. lacustris Munro, 1964	Lake Kutubu, Papua New Guinea
M. lakamora Allen, 1996	Lakes Lakamora & Aiwaso, Irian Jaya
M. maccullochi Ogilby, 1915	N Australia & southern New Guinea
M. maylandi Allen, 1982	Lake Holmes vicinity, Irian Jaya
M. misoolensis Allen, 1982	Misool Island, Irian Jaya
M. monticola Allen, 1980	Kikori & Purari R., Papua New Guinea
M. mubiensis Allen, 1996	Kikori R. system, Papua New Guinea
M. nigrans (Richardson, 1843)	W Aust., N Terr., & NE Queensland
M. ogilbyi Weber, 1910	Central-southern Irian Jaya
M. oktediensis Allen et Cross, 1980	Upper Fly system, Papua New Guinea
M. papuae Allen, 1980	Port Moresby area, Papua New Guinea
M. parkinsoni Allen, 1980	South-eastern Papua New Guinea
M. parva Allen, 1990	E Bintuni Bay, Irian Jaya
M. pierucciae Allen, 1996	Lake Kamaka area, Irian Jaya
M. pimaensis Allen, 1981	Upper Purari R., Papua New Guinea
M. praecox (Weber et De Beaufort, 1910)	Mamberamo Valley, Irian Jaya
M. pygmaea Allen, 1974	Kimberley District, NW Australia
M. sexlineata Munro, 1964	Upper Fly system, Papua New Guinea
M. splendida (Peters, 1866)*	widespread, N Aust. & S New Guinea
M. trifasciata (Rendahl, 1922)	Northern Territory & NE Queensland
M. sylvatica Allen, new species	Lakekamu system, Papua New Guinea
M. vanheurni (Weber et De Beaufort, 1922)	Mamberamo Valley, Irian Jaya

* 5 subspecies recognized: *australis* (Castelnau, 1875), *inornata* (Castelnau, 1875), *splendida* (Peters, 1866), *tatei* (Zietz, 1896) and *rubrostriata* (Ramsay et Ogilby, 1886).

Table 2

Summary of dorsal, anal, and pectoral fin-ray counts for members of the « maccullochi group » of *Melanotaenia*.

Résumé des comptes des rayons des nageoires dorsale, anale et pectorale des *Melanotaenia* du « groupe maccullochi »

	First Dorsal Fin Spines				Soft Dorsal Rays					
	IV	V	VI	VII	7	8	9	10	11	12
caerulea		29	29	1	2	14	31	11	1	
maccullochi	4	71	40	1	3	36	44	30	2	
ogilbyi		5	14	3			2	10	10	
papuae	6	58	8				28	36	11	1
sexlineata		4	6	1				1	7	3
sylvatica	1	20	5				5	15	6	

	Soft Anal Rays							Pectoral Rays			
	13	14	15	16	17	18	19	11	12	13	14
caerulea		8	29	18				25	21	2	
maccullochi	1	14	48	42	8			3	69	42	1
ogilbyi					11	8	3		7	12	3
papuae		1	12	37	25	2			28	42	7
sexlineata				2	6	1	2			10	1
sylvatica			2	10	10	4			16	15	

Table 3

Proportional measurements of selected type specimens of *Melanotaenia sylvatica* expressed as percentage of the standard length

Dimensions relatives de spécimens types choisis de *Melanotaenia sylvatica*, exprimées en pourcentage de la longueur standard

	Holotype WAM P.31224 -001 male	Paratype WAM P.31224 -002 male	Paratype WAM P.31224 -002 male	Paratype WAM P.31224 -002 female	Paratype WAM P.31224 -002 female	Paratype WAM P.31224 -002 female
Standard length (mm)	55.0	50.5	48.2	50.7	40.6	37.6
Body depth	33.6	33.3	35.5	30.4	28.8	29.8
Body width	11.6	11.9	12.2	12.4	12.8	13.3
Head length	26.2	26.5	26.1	26.2	26.6	28.2
Snout length	8.2	7.9	7.1	8.1	7.1	7.4
Eye diameter	8.9	8.1	8.5	8.7	10.1	9.8
Bony interorbital width	9.1	8.9	9.3	9.1	9.1	9.3
Depth of caudal peduncle	11.5	10.9	10.8	9.3	9.6	9.6
Length of caudal peduncle	19.1	18.2	18.7	18.3	18.2	18.9
Predorsal distance	44.0	43.0	43.6	45.2	45.1	46.5
Preanal distance	47.5	49.5	48.3	51.5	52.0	51.3
Prepelvic distance	35.5	36.0	35.3	36.5	37.9	38.0
2nd dorsal fin base	25.5	22.2	22.8	21.7	21.2	20.2
Anal fin base	39.3	34.5	38.2	34.5	32.0	30.6
Pectoral fin length	15.5	17.0	17.6	14.8	16.7	18.1
Pelvic fin length	16.2	14.5	15.4	13.6	12.8	13.8
Longest ray 1st dorsal fin	16.9	17.0	19.3	12.4	11.8	12.2
Longest ray 2nd dorsal fin	15.3	16.4	17.6	12.8	14.0	14.9
Longest anal ray	17.6	13.5	13.1	12.0	12.8	13.0
Caudal fin length	21.3	21.8	22.2	19.7	22.9	22.1

Comparisons

Melanotaenia sylvatica belongs to a species complex known as the "maccullochi group" (**Allen** 1981), which includes *M. caerulea* (Lower and Middle Kikori River system), *M. maccullochi* (N. Australia and Fly River delta), *M. ogilbyi* (Lorentz River region of Irian Jaya), *M. papuae* (vicinity of Port Moresby, Papua New Guinea), and *M. sexlineatus* (Upper Fly River). The group is characterised by a relatively small maximum size, similar shape, and a relatively low number of dorsal, anal, and pectoral rays (7-11, 14-19, and 11-14 respectively), as well as a low number of cheek and predorsal scales (10-16 and 13-17 respectively). Fin rays counts are contrasted in Table 1. Although the members of the group have similar live colour patterns, each is clearly distinct (see **Allen** 1995). Live colours are most similar to *Melanotaenia caerulea* (Fig. 3), but it lacks the pronounced neon blue that covers much of the body. There are also differences in modal fin-ray counts bet- ween these two species (Table 2). Preserved specimens, which show a distinct blackish midlateral stripe, closely resemble *M. ogilbyi* (Fig. 4), but the two species have differnt live colours and there is a modal difference in the number of soft anal rays (Table 2). The known geographic distributions of this pair are separated by a distance of approximately 900 km. Specimens deposited at WAM were utilised for comparisons of members of the "maccullochi group".

Etymology

The species is named *sylvatica* (Latin: "of the forest") with reference to its typical forest stream habitat.

Acknowledgements

Funds for the Lakekamu fish survey were provided by Conservation International under the auspices of. **Andrew Mack**. I am especially grateful to CI and Friends of the South Pacific Society personnel and visiting researchers at the Ivimka Conservation Camp for aiding my collection efforts and providing valuable logistic support. These people included **Andrew Mack, Deb Wright, Thomas Paka, John Sengo, Stephen Richards,** and **Kurt Merg**.

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RÉSUMÉ

Une nouvelle espèce de Poisson Arc-en-ciel (*Melanotaenia*: Melanotaeniidae)

du bassin de la Lakekamu, Nouvelle-Guinée Papouasie

La nouvelle espèce décrite ici a été récoltée par l'auteur, au cours d'une Enquête internationale sur la Conservation de la Faune dans le haut bassin de la Lakekamu River, dans le Sud-Est de la Nouvelle-Guinée Papouasie, à 150 km environ au Nord-Ouest de Port Moresby, sur la pente Sud de la chaîne centrale. Les lieux de récolte étaient situés dans la Lakekamu River à 15-20 km en amont de son confluent et dans la Sapoi River et ses affluents forestiers à 90-100 km de la mer, près de la transition entre les basses terres et le relief montagneux, à des altitudes comprises entre 35 et 120 m. Elle fréquente principalement les petits cours d'eau (1 à 3 m de large) clairs, lents, sous la canopée, à fond de vase ou de gravier recouvert de feuilles et de débris ligneux. Une plante submergée (*Hydrostemma motleyi* : Nymphaeaceae) était commune dans beaucoup de cours d'eau. Les Poissons étaient les plus abondants dans les trous d'eau (0,50 à 1 m de profondeur), derrière des branches tombées ou des racines contreforts de grands arbres. Ils étaient accompagnés d'une communauté de quelques espèces seulement : un autre *Melanotaenia (goldiei)*, un Plotoside, un Téraponide, un Gobiide et deux Eléotrides. Outre ses biotopes en forêt primaire, l'espèce se rencontre aussi dans le lit principal de la Sapoi River, jusqu'à 3 m de profondeur, mais à moins de 50 m d'altitude ; plus haut, la rivière passe rapidement du cours lent des eaux de plaine, au régime des torrents de montagne. Plus d'une quinzaine d'espèces l'y accompagnent.

L'espèce appartient à un complexe connu comme « groupe maccullochi ». Elle est particulièrement voisine de *L. caerulea* Allen, 1996 et de *M. ogilbyi* Weber, 1910 (Figs 3 et 4) auxquels elle est très semblable par le patron de coloration, mais dont elle se distingue par les comptes des rayons mous des nageoires.

J.E. Randall

Erratum : vol. 23 (3-4) : 107, fig. 4, **G. Allen** and **J.E. Randall.**

Fig. 4. - *Cirrhilabrus pylei,* underwater photograph of female, approximately 55 mm TL. Samarai Island, Papua New Guinea.
Cirrhilabrus pylei, photographie sous-marine d'une femelle, ca 55 mm LT. Samarai Island, Papua New Guinea.

Replace the name *pylei* by *condei.*
Remplacer le nom *pylei* par *condei.*