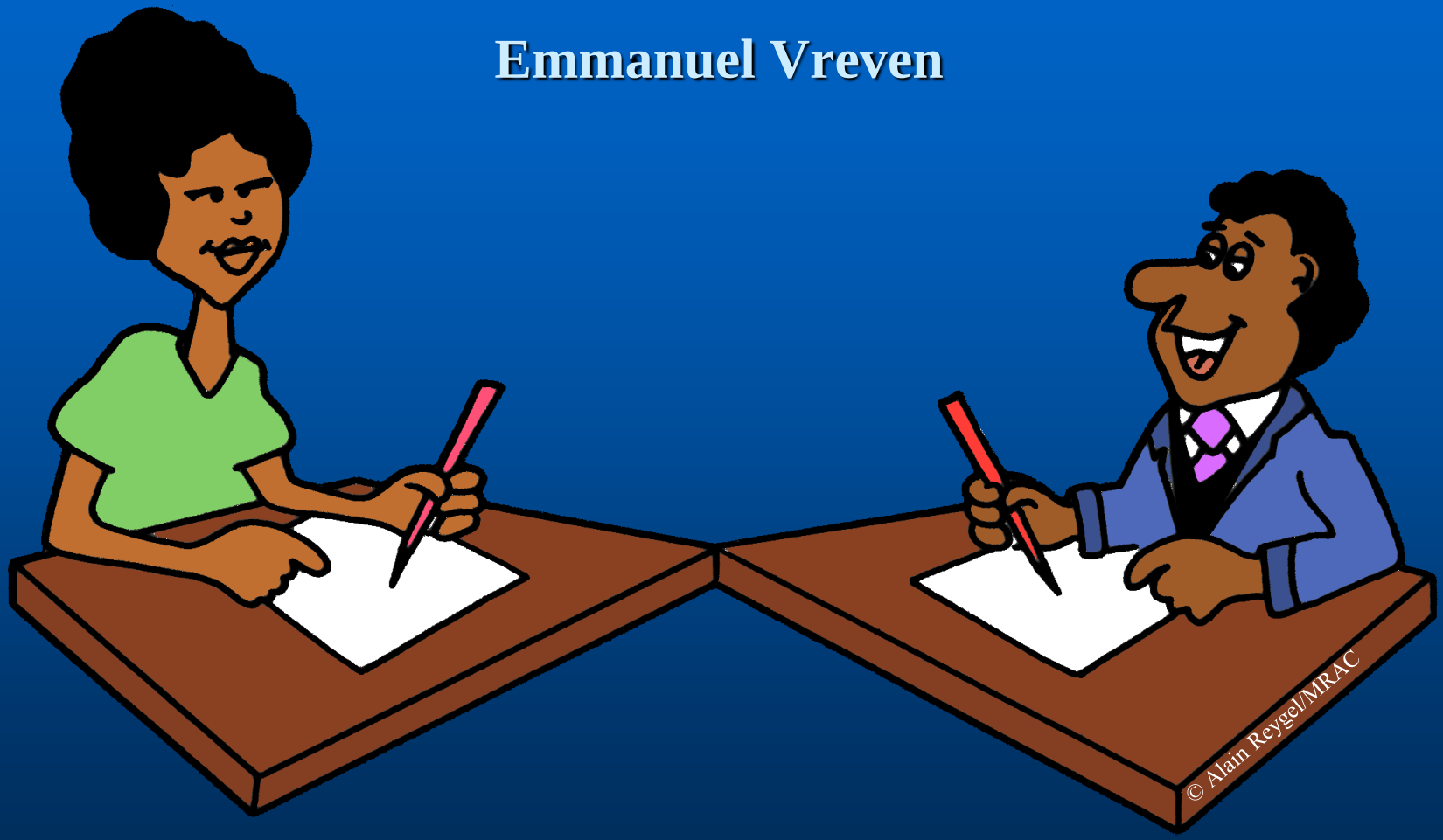
Fish Taxonomy – Writing an article

Emmanuel Vreven



Writing the article

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- - Historic Overview
- - Analysis: Meristics
- - Analysis: Morphometrics
- DESCRIPTIONS
- DISCUSSION
- ACKNOWLEDGEMENTS (institutions, referees, other persons, institutions)
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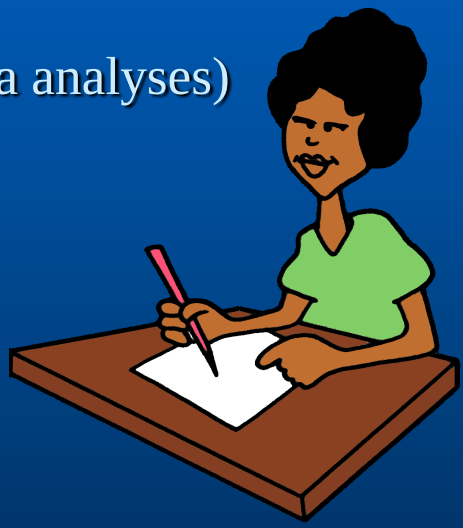

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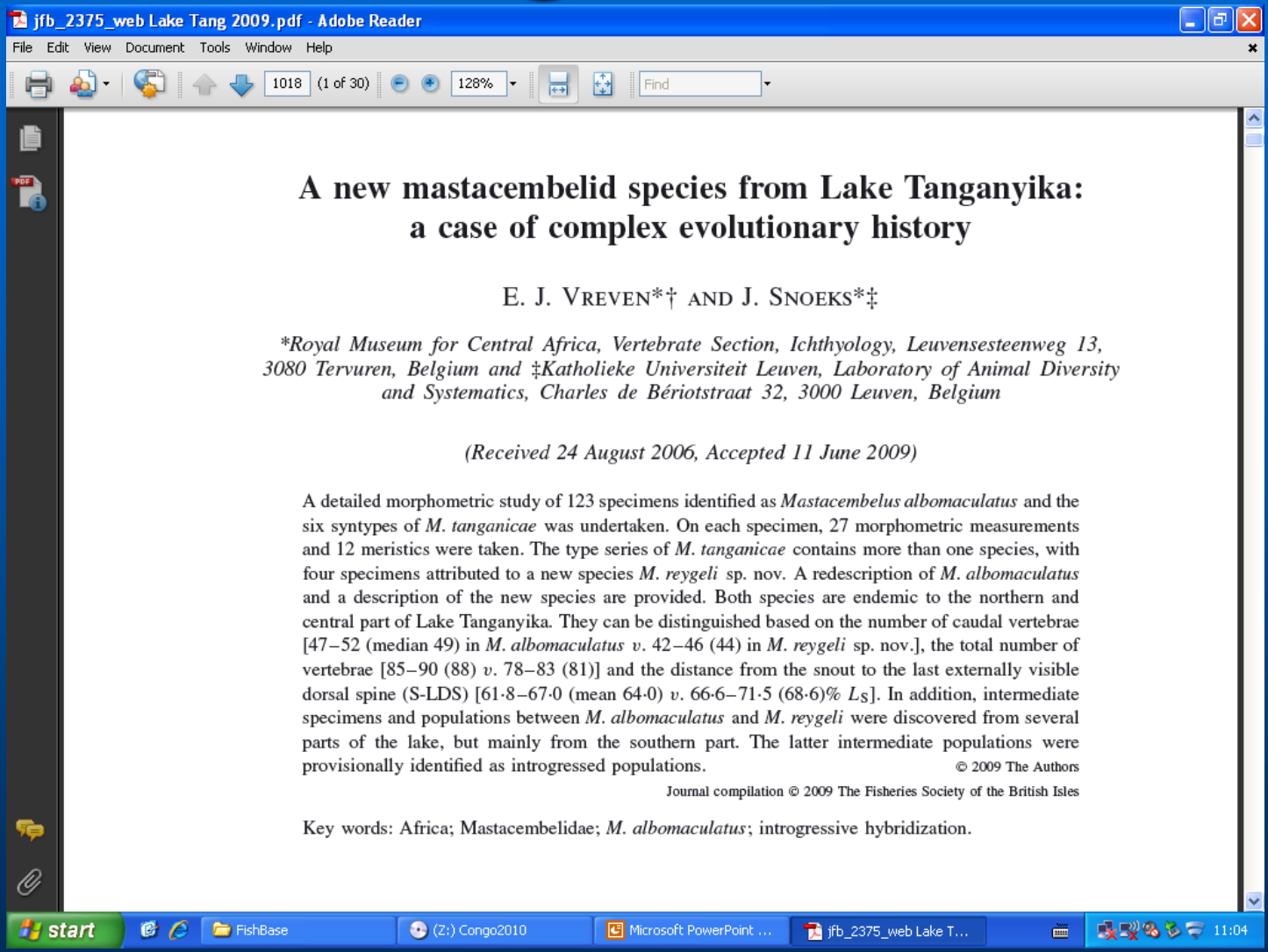

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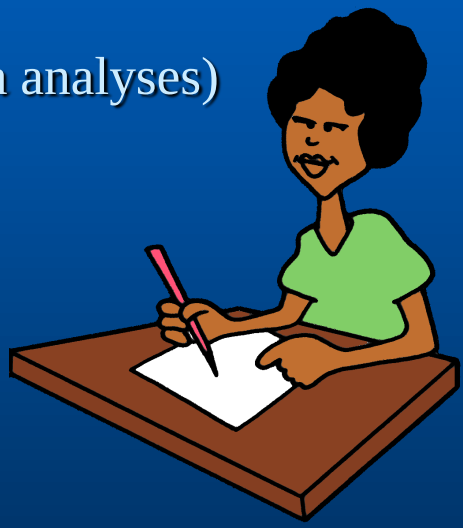

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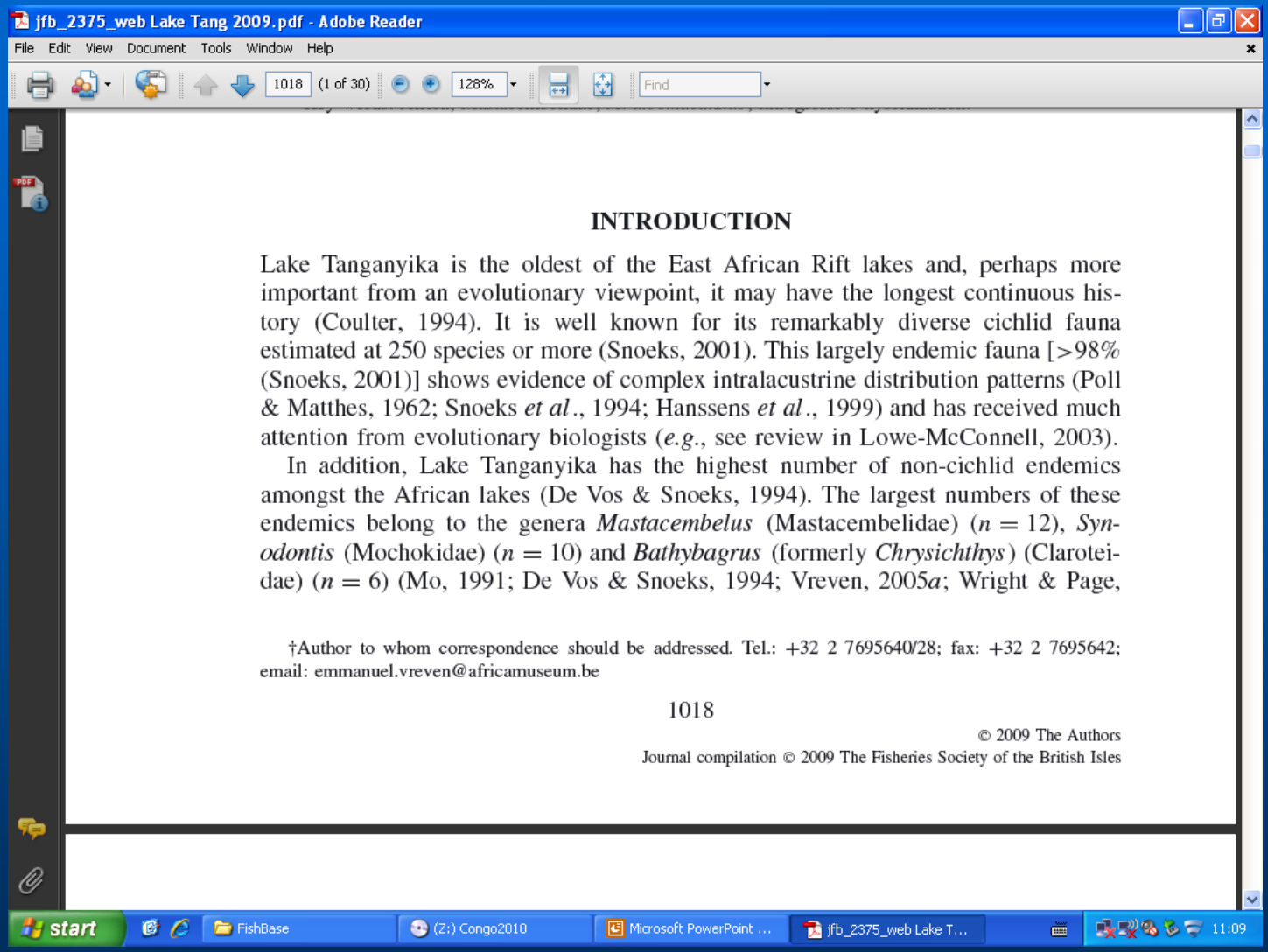

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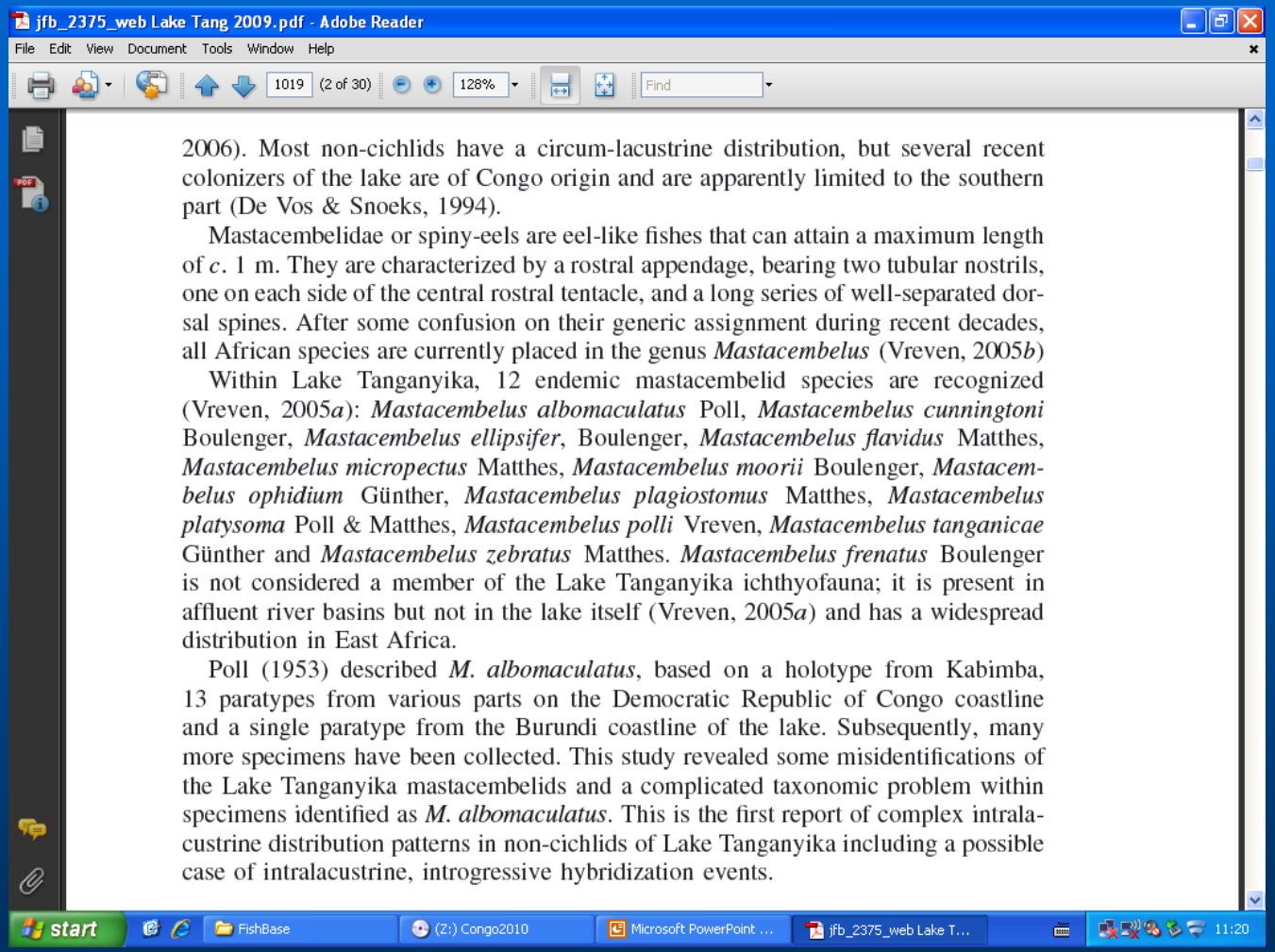

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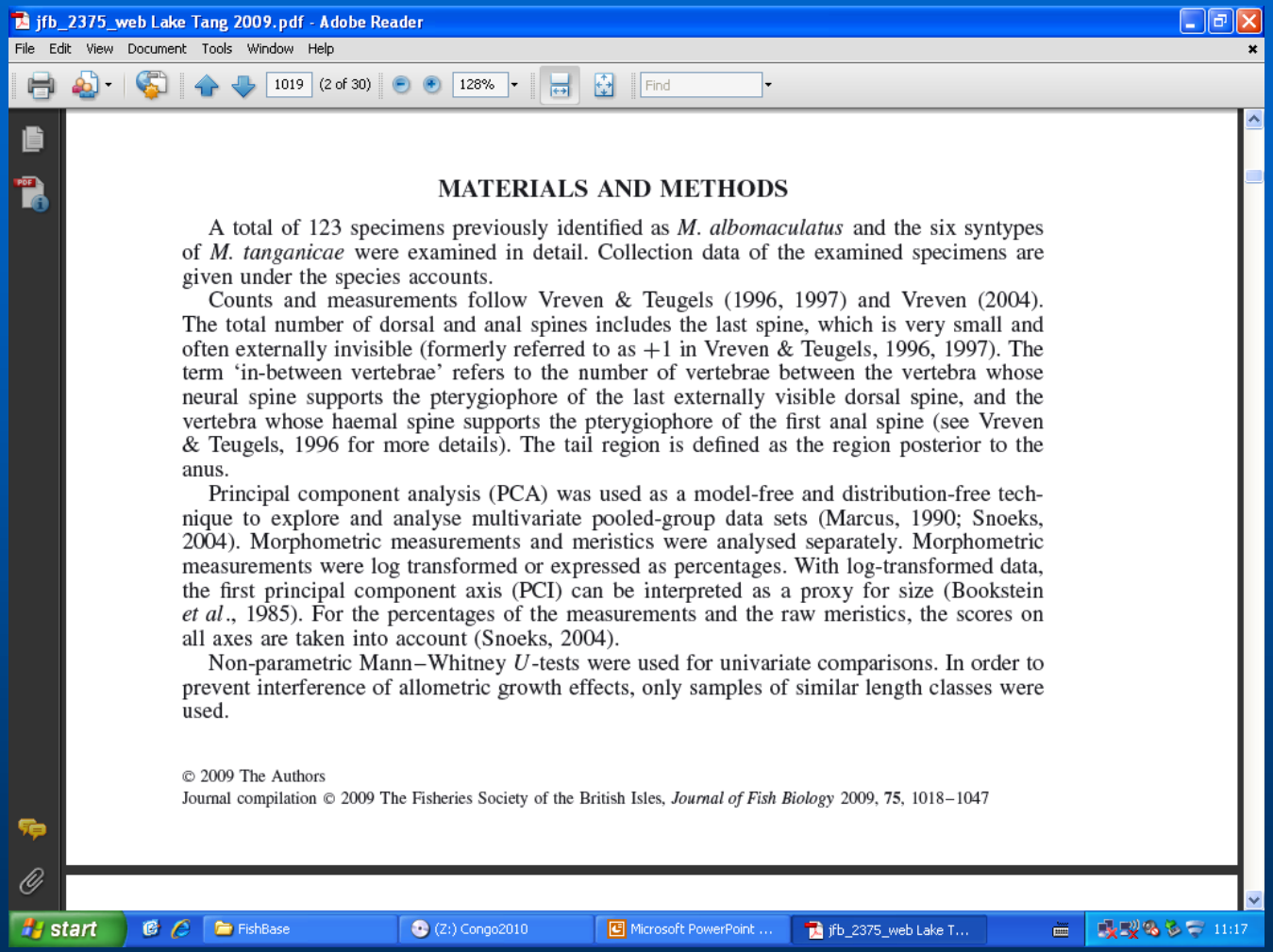

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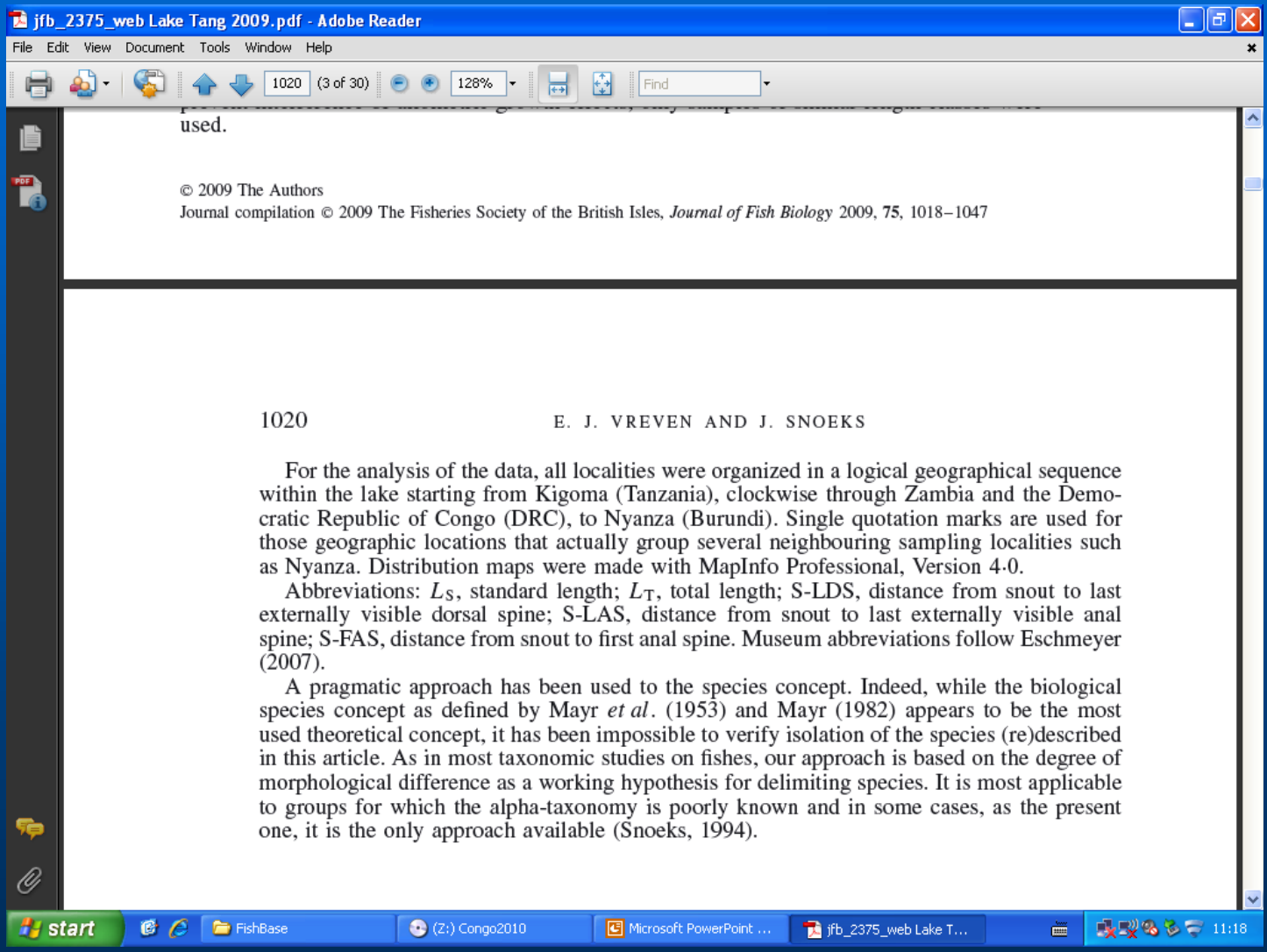

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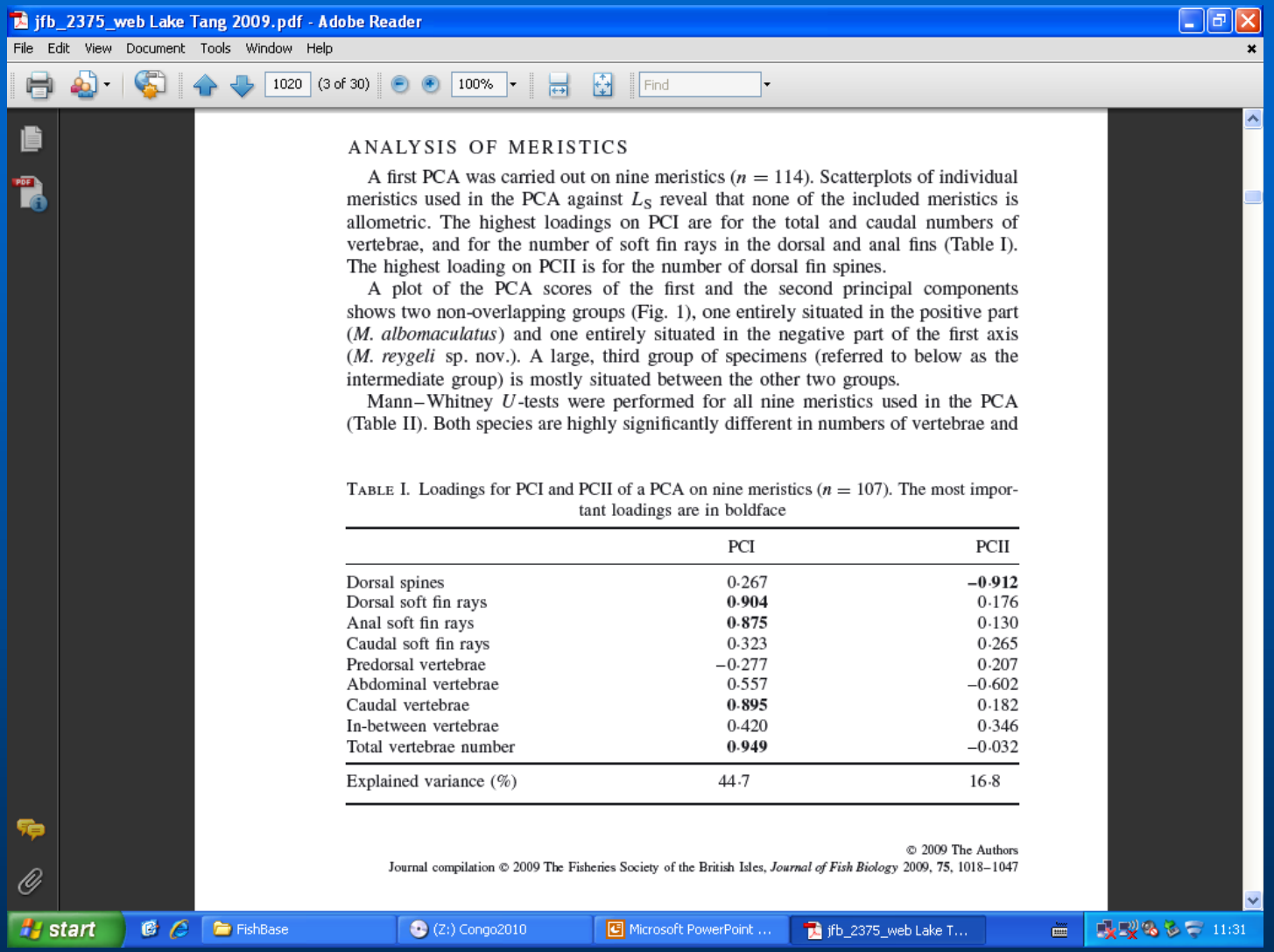

ANALYSIS OF MERISTICS

A first PCA was carried out on nine meristics ($n = 114$). Scatterplots of individual meristics used in the PCA against L_S reveal that none of the included meristics is allometric. The highest loadings on PCI are for the total and caudal numbers of vertebrae, and for the number of soft fin rays in the dorsal and anal fins (Table I). The highest loading on PCII is for the number of dorsal fin spines.

A plot of the PCA scores of the first and the second principal components shows two non-overlapping groups (Fig. 1), one entirely situated in the positive part (*M. albomaculatus*) and one entirely situated in the negative part of the first axis (*M. reygeli* sp. nov.). A large, third group of specimens (referred to below as the intermediate group) is mostly situated between the other two groups.

Mann–Whitney *U*-tests were performed for all nine meristics used in the PCA (Table II). Both species are highly significantly different in numbers of vertebrae and

TABLE I. Loadings for PCI and PCII of a PCA on nine meristics ($n = 107$). The most important loadings are in boldface

	PCI	PCII
Dorsal spines	0·267	**−0·912**
Dorsal soft fin rays	**0·904**	0·176
Anal soft fin rays	**0·875**	0·130
Caudal soft fin rays	0·323	0·265
Predorsal vertebrae	−0·277	0·207
Abdominal vertebrae	0·557	−0·602
Caudal vertebrae	**0·895**	0·182
In-between vertebrae	0·420	0·346
Total vertebrae number	**0·949**	−0·032
Explained variance (%)	44·7	16·8

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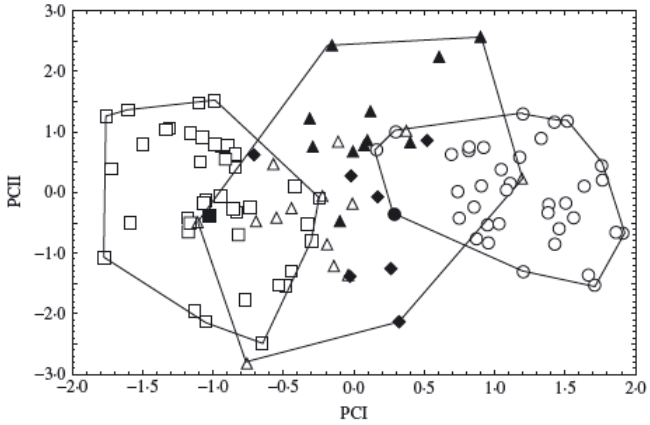

FIG. 1. Plot of scores on the first and second axis of a PCA on nine meristics for all examined specimens ($n = 114$). *Mastacembelus albomaculatus*: ●, holotype; ○, other specimens; *Mastacembelus reygeli* sp. nov.: ■, holotype; □, other specimens. Intermediate group: △, from Sumbu; ▲, from Mpulungu; and ◆, other localities. Full lines enclose scores of each species and the intermediate group separately.

numbers of dorsal and anal soft fin rays. Both species are also highly significantly different from the intermediate group in numbers of caudal and total vertebrae, and in numbers of soft dorsal fin rays.

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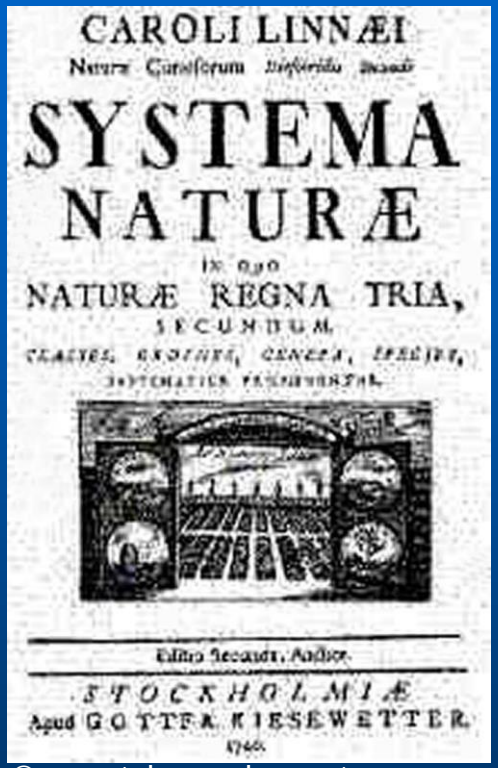
A species (re)description

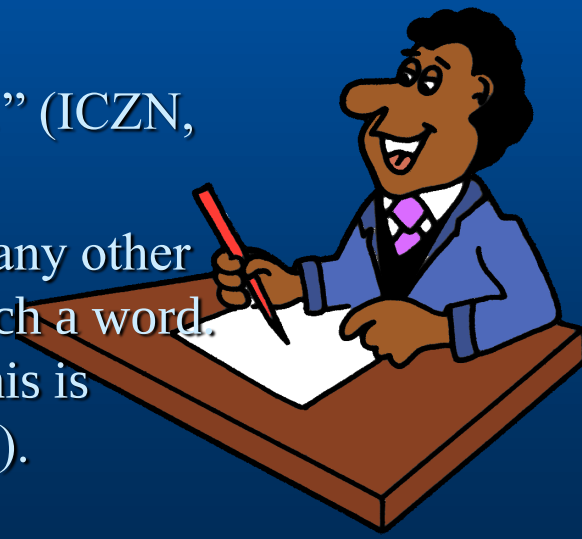
- Species name
- Synonyms and citations
- Type specimens
- Etymology
- Diagnosis
- Description
- Distribution
- Ecology
- List of specimens examined
- Illustrations


CAROLI LINNÆI
SYSTEMA
NATURÆ
NATURÆ REGNA TRIA,
SECUNDUM
STOCKHOLMIÆ
Apud GOTTFR. KIESEWETTER.

Carolus Linneaus (1707-1778)

Species name

- ICZN (1999). http://www.iczn.org/iczn/index.jsp
- "The scientific name of a species, …, is a combination of two names (a binomen), the first being the generic name and the second being the specific name. The generic with a lower-case letter…" (ICZN, 1999: Article 5.1.). name must begin with an upper-case letter and the specific name must begin.
- "A scientific name must, when first published, have been spelled only in the 26 letters of the Latin alphabet…" (ICZN, 1999: Article 11.2.).
- "A species name must be a word of two or more letters…" (ICZN, 1999: Article 11.9.1.).
- "… a name may be a word derived from Latin, Greek or any other language (even one with no alphabet), or formed from such a word. It may be an arbitrary combination of letters providing this is formed to be used as a word." (ICZN, 1999: Article 11.3.).

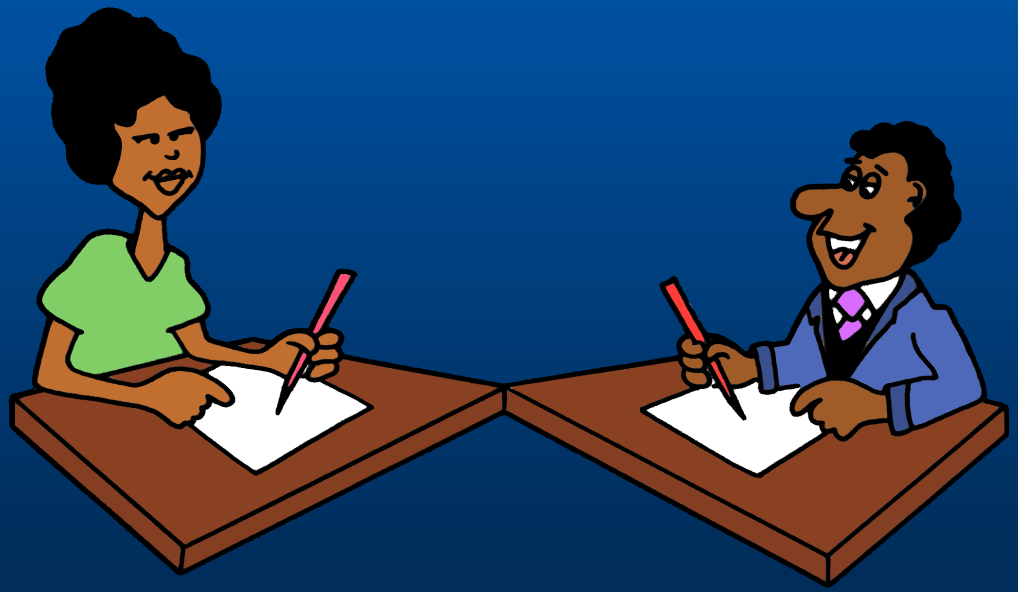


Species name

- Species name derived from the name of a person: *M. cunningtoni.*
- Species name derived from the name of a river: *M. taiaensis.*
- A diagnostic species name: *M. paucispinis.*
- Species name referring to a local species name: *Anaspidoglanis* “pembetadi” .

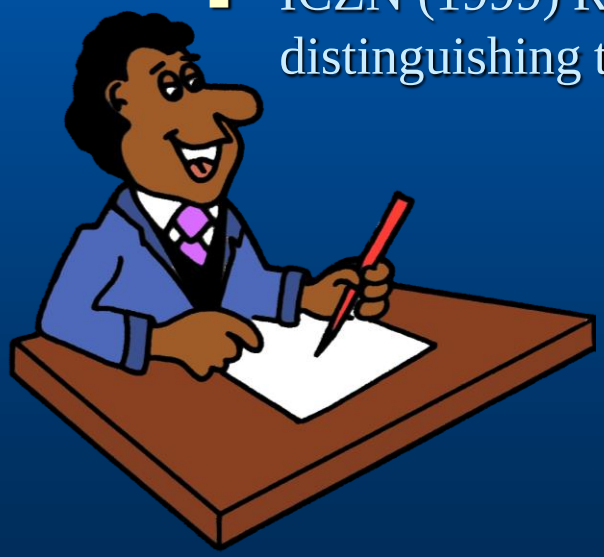
Synonyms and citations

- Synonyms (junior and senior synonyms).
- Citations (Annotated bibliography).
- Principle of Priority (ICZN, 1999: 23.1.).
- Exceptions (ICZN, 1999).



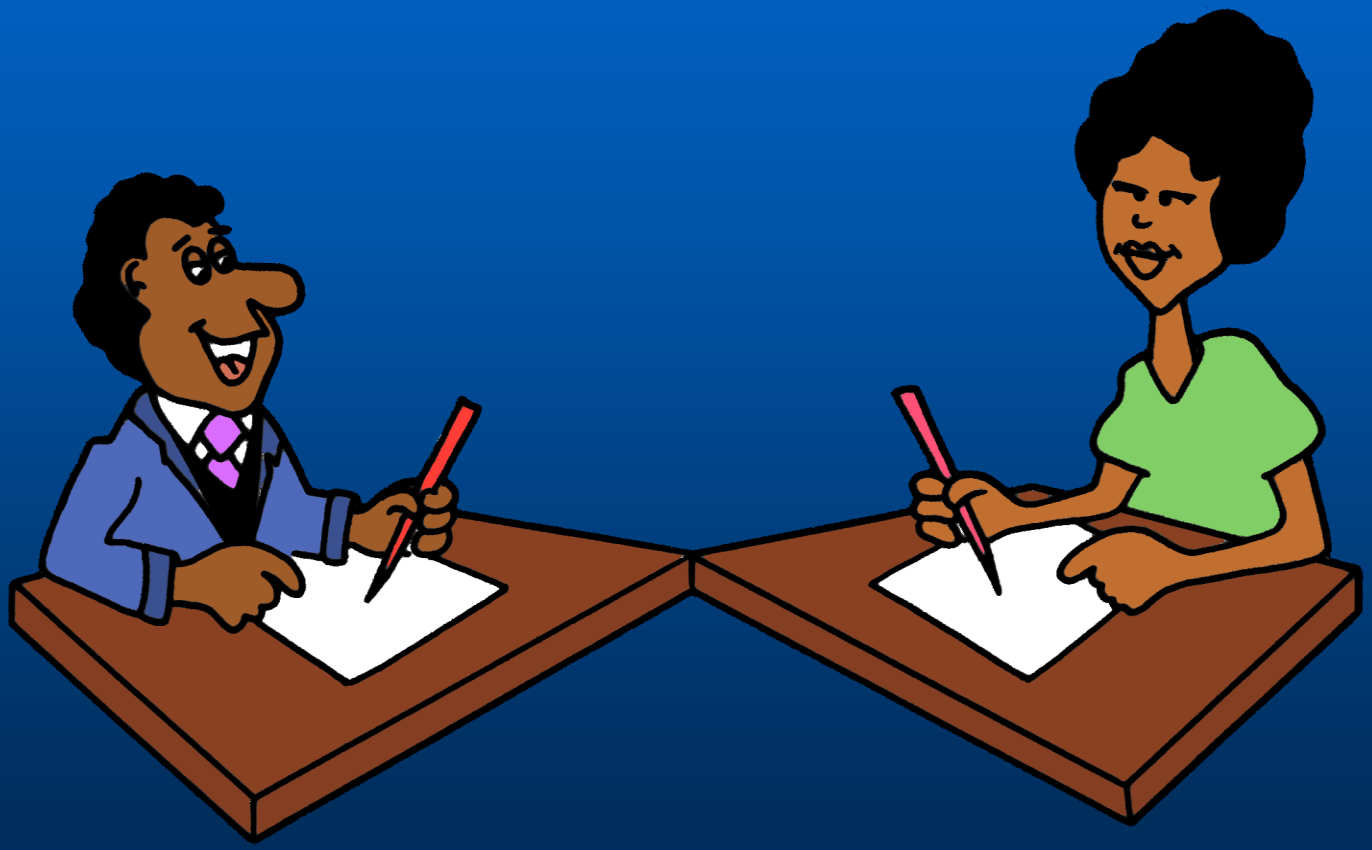
Type material

- Type material
- Holotype: name bearing specimen
- Paratype(s)
- Additional specimens
- ICZN (1999) Recommendation 16C. Preservation and deposition of type specimens.
- ICZN (1999) Recommendation 16D. Publication of information distinguishing type specimens.



Etymology

- Meaning and origin of the species name.



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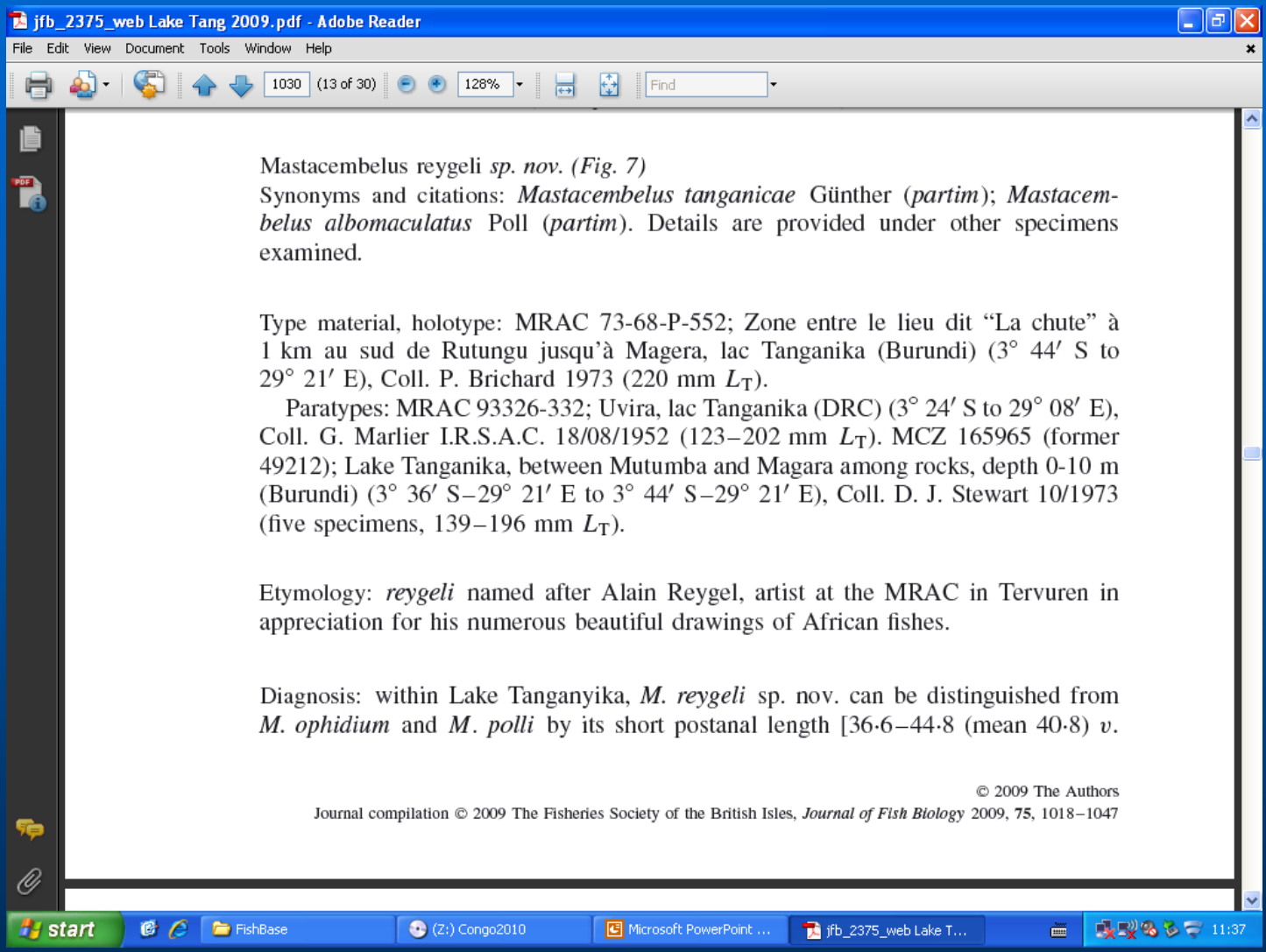
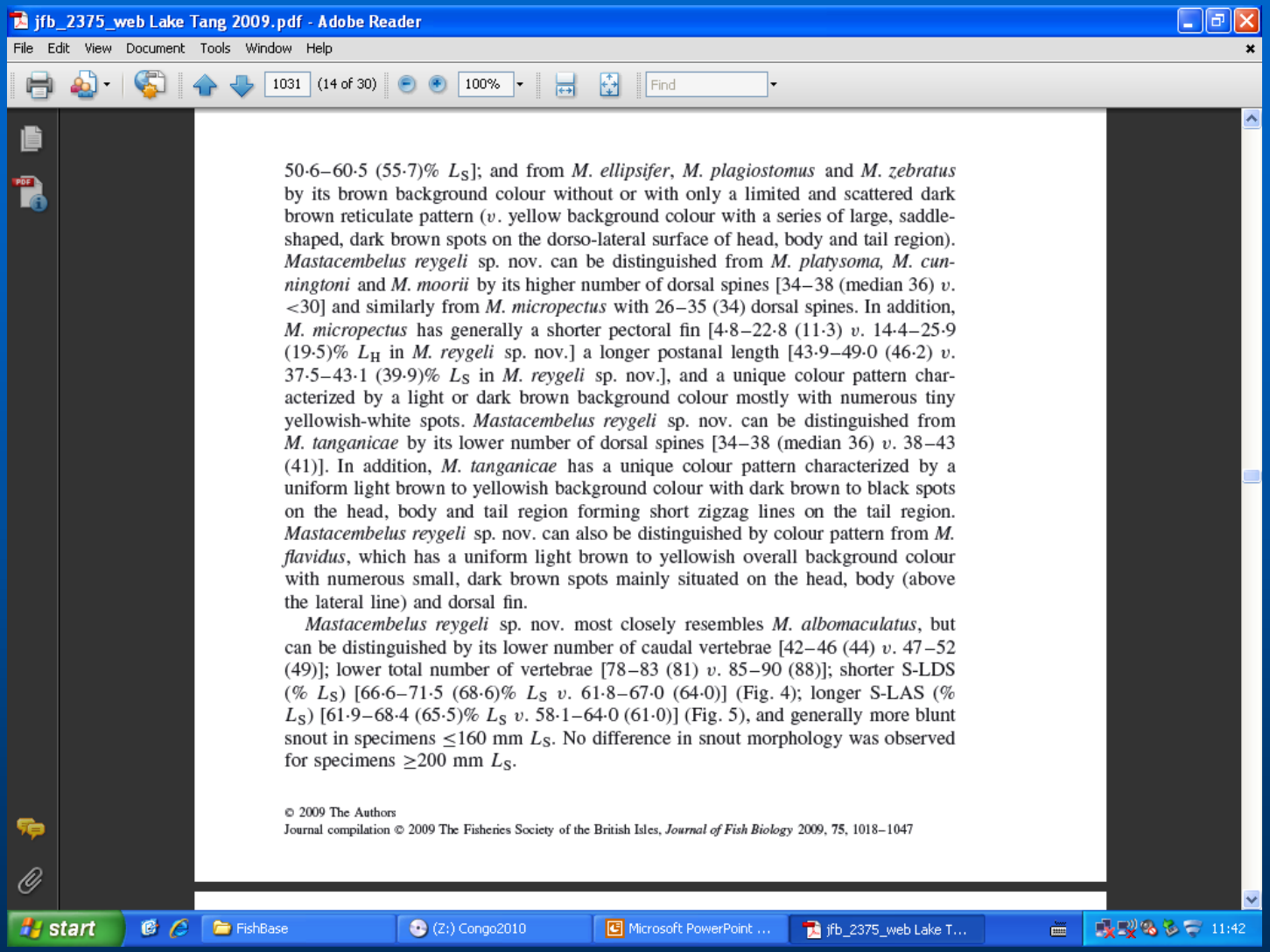


Diagnosis

- Diagnosis [Definition: “In taxonomy, a formal statement of the characters (or most important characters that distinguish a taxon from other or closely related coordinate taxa … (Mayr & Aslock, 1991: 413)] *versus* Description
- Differential diagnosis
- Binary system : avoidance of generic characters in Diagnosis and Description
- Sequence of characters
- Measurements and counts: references and definitions under Material and Methods

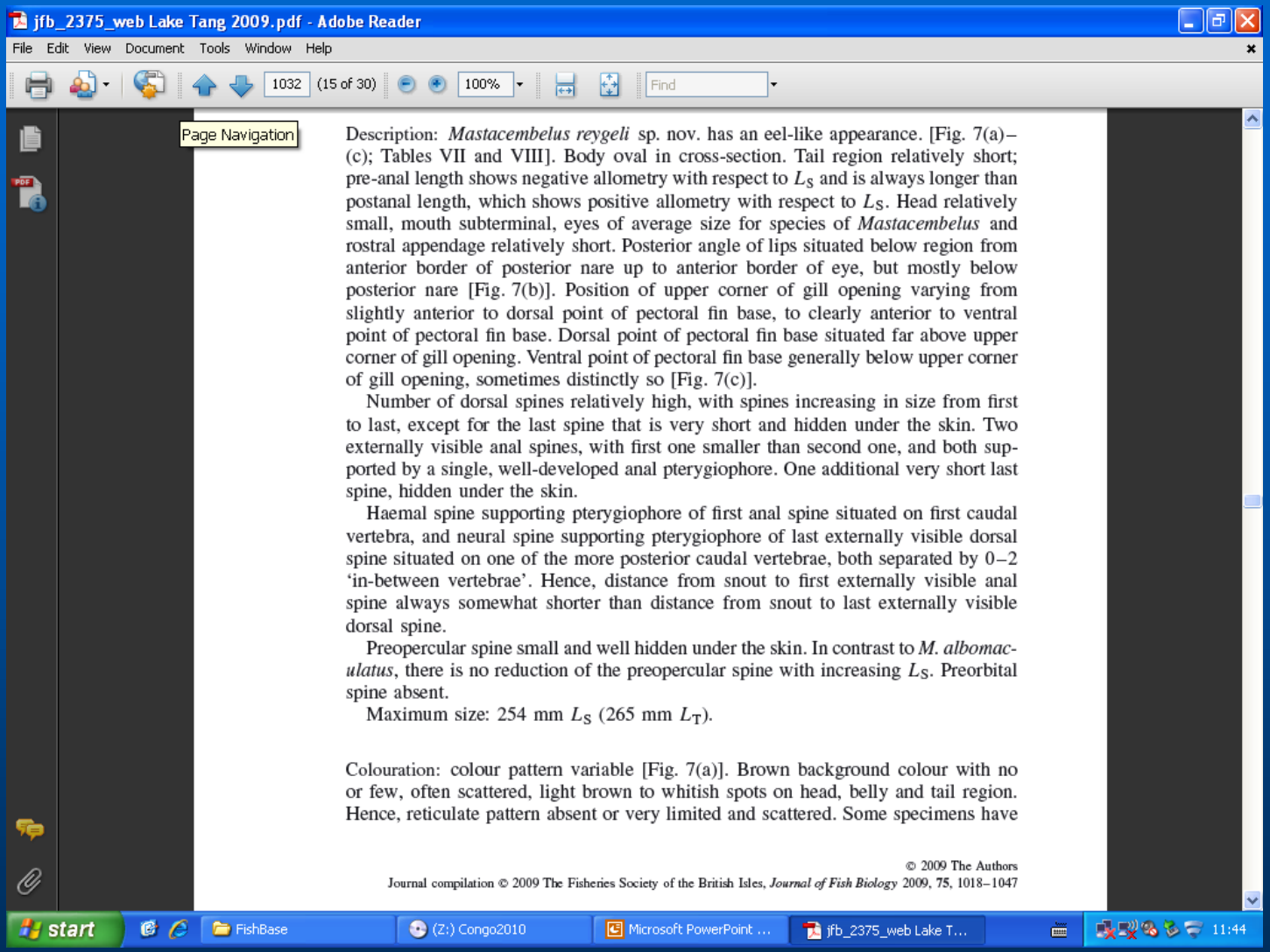
Writing the article



Description

- Definition: “In taxonomy, a more or less complete formal statement of the characters of a taxon without special emphasis on hose which set limits to the taxon or distinguish it from coordinate taxa” (Mayr & Aslock, 1991: 413).
- Original description: two main objectives 1) recognition and identification and 2) making the new name available.
- Redescription

Writing the article



Distribution

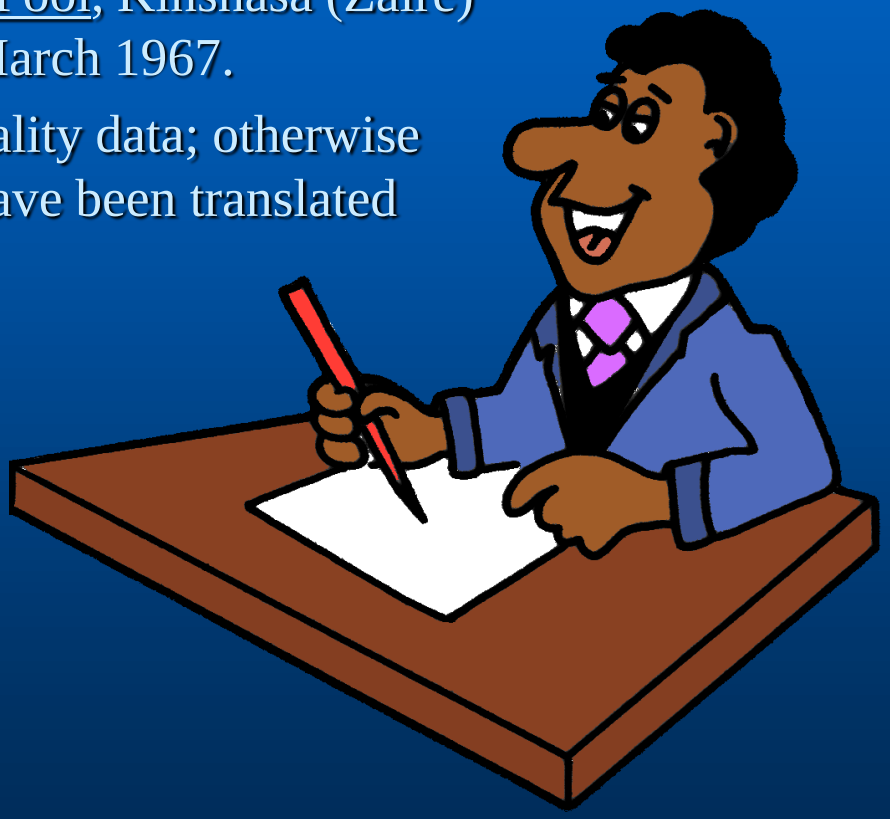
- Distribution based on the available data from your own research
- Revised data (full symbol)
- Literature data (open symbol)
- Collecting locality data as precise as possible
- Coordinates: country gazetteers

Ecology

- If available:
- Rapids, pools, riffles etc…
- Physicochemical parameters of the water etc…
- Savanna, Forest etc…

List of specimens examined

- Future researchers…
- MRAC 177695, 358 mm TL, Stanley-Pool, Kinshasa (Zaïre) (± 4°06'S-15°15'E), P. Brichard, 23 March 1967.
- By preference, do not translate the locality data; otherwise clearly stipulate that all locality data have been translated
- By species, by basin, by country…



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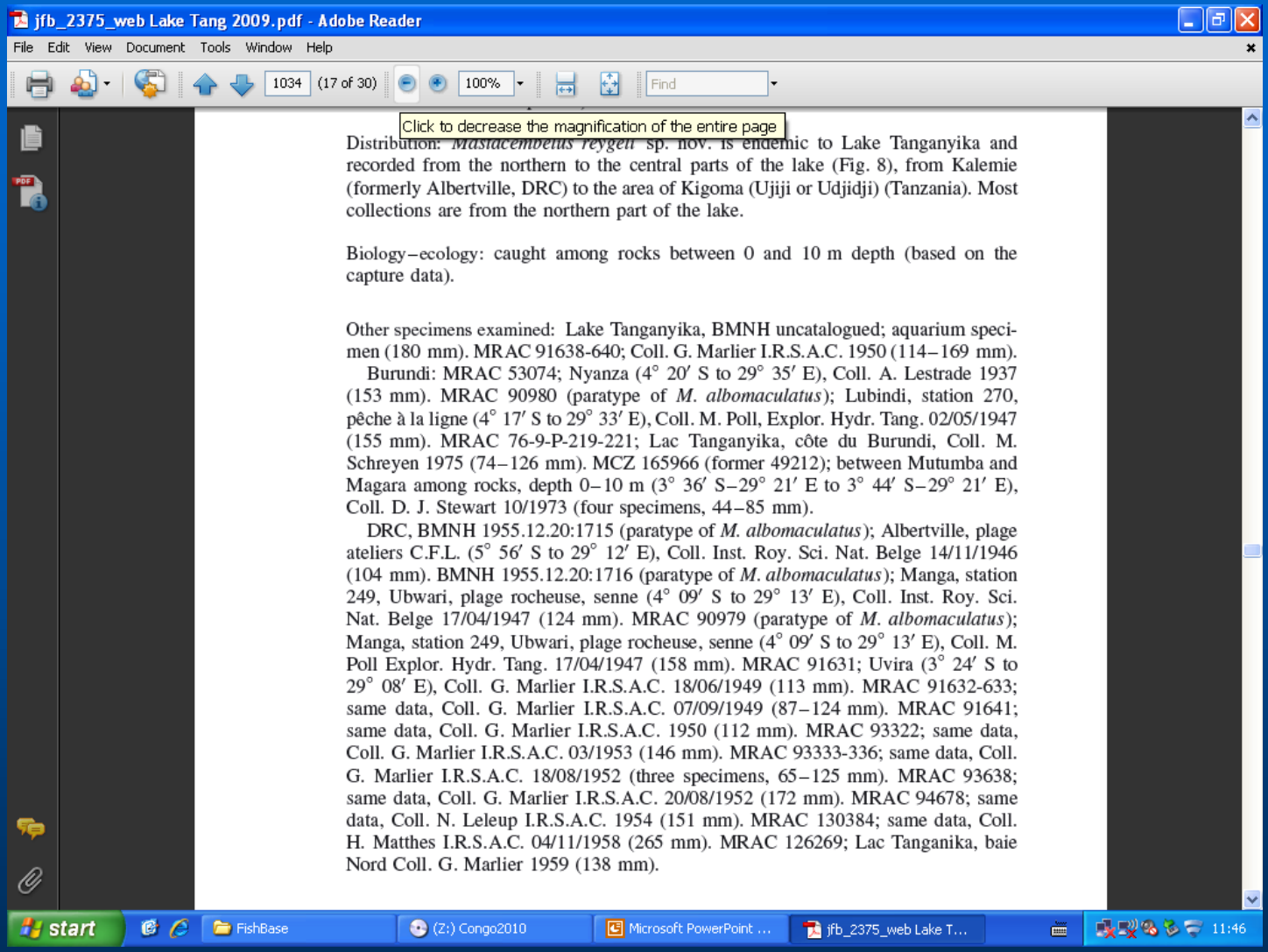
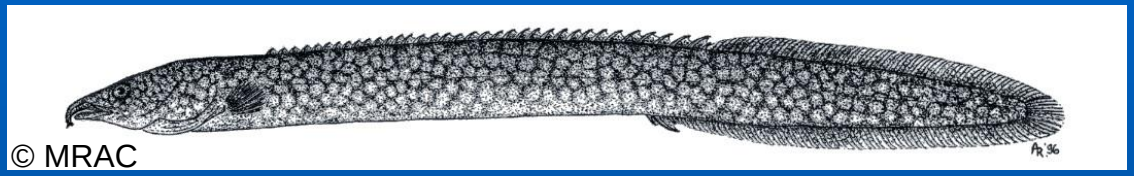


Illustrations

- "A drawing tells more than a thousand words"
- Standard procedure to illustrate the left side of the fish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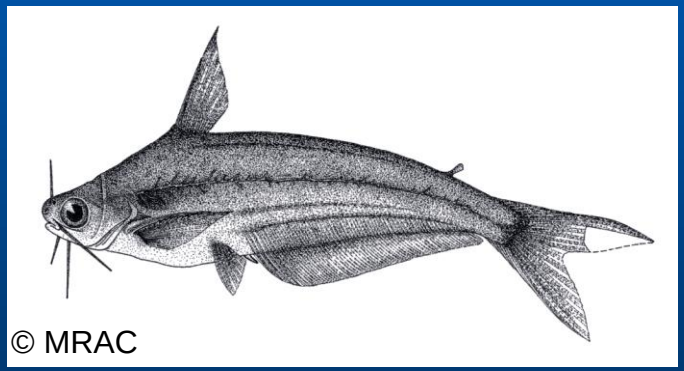
Mastacembelus albomaculatus Poll, 1953 (Vreven & Snoeks, 2009)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Schilbe nyongensis (De Vos, 1981)


© Josh at www.juliangibson.com/images/cartoon/fish01.jpg

Illustrations

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SYSTEMATICS OF LAKE TANGANYIKA MASTACEMBELIDAE 1031

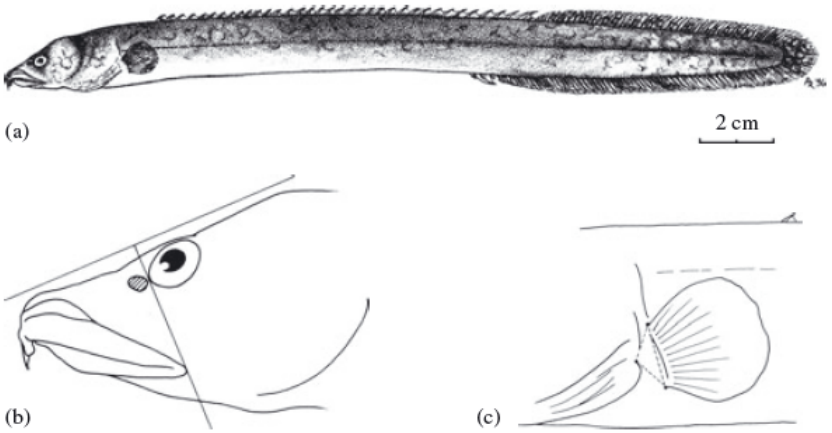

FIG. 7. *Mastacembelus reygeli* sp. nov., holotype, 220 mm L_T. (a) Lateral view. (b) Position of posterior angle of lips to posterior nare and eye. Vertical line is perpendicular to a horizontal line parallel with the upper surface of the head. (c) Detail of pectoral fin region. Upper corner of gill slit, dorsal and ventral point of pectoral fin base connected by dashed lines.

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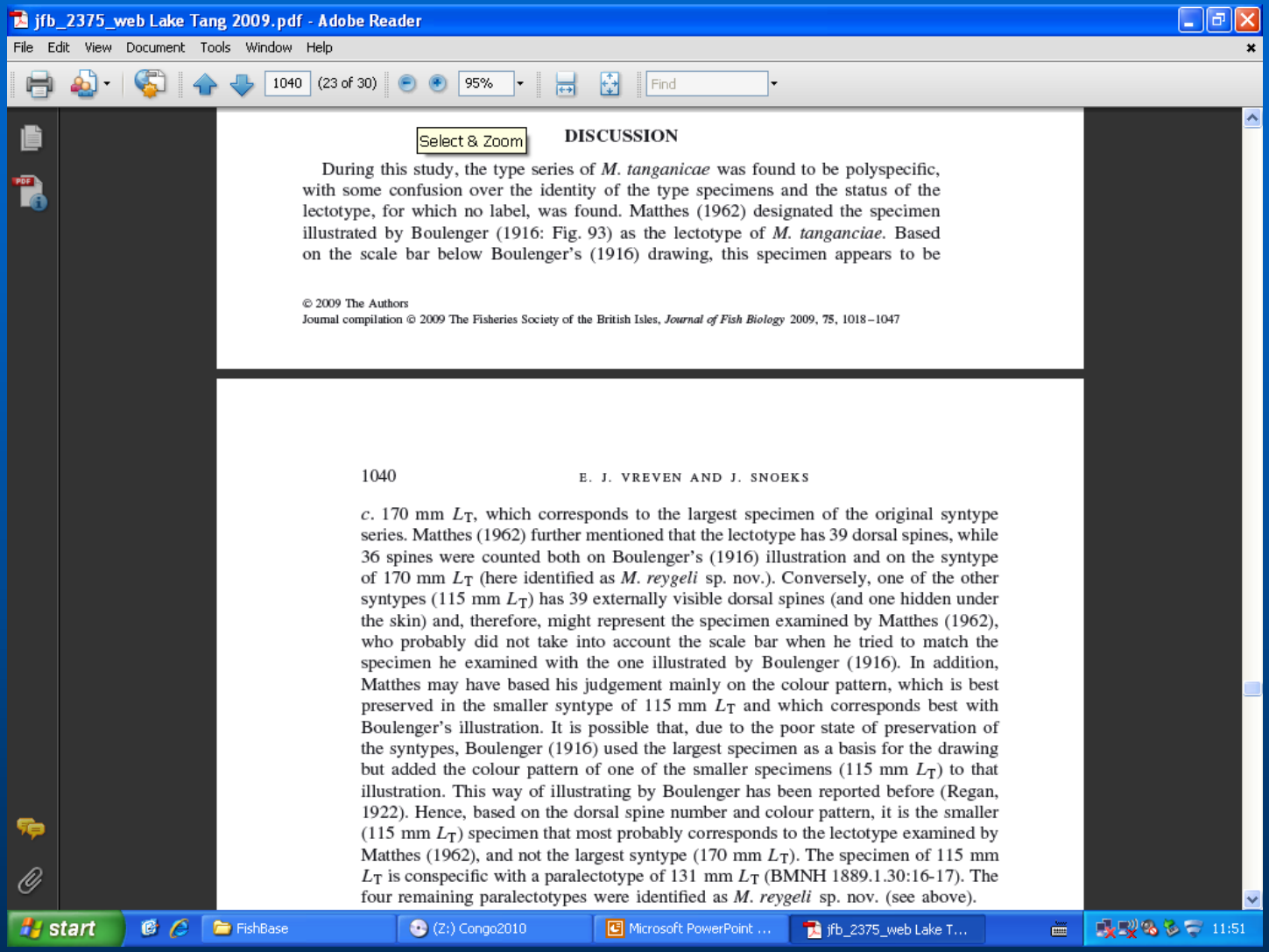

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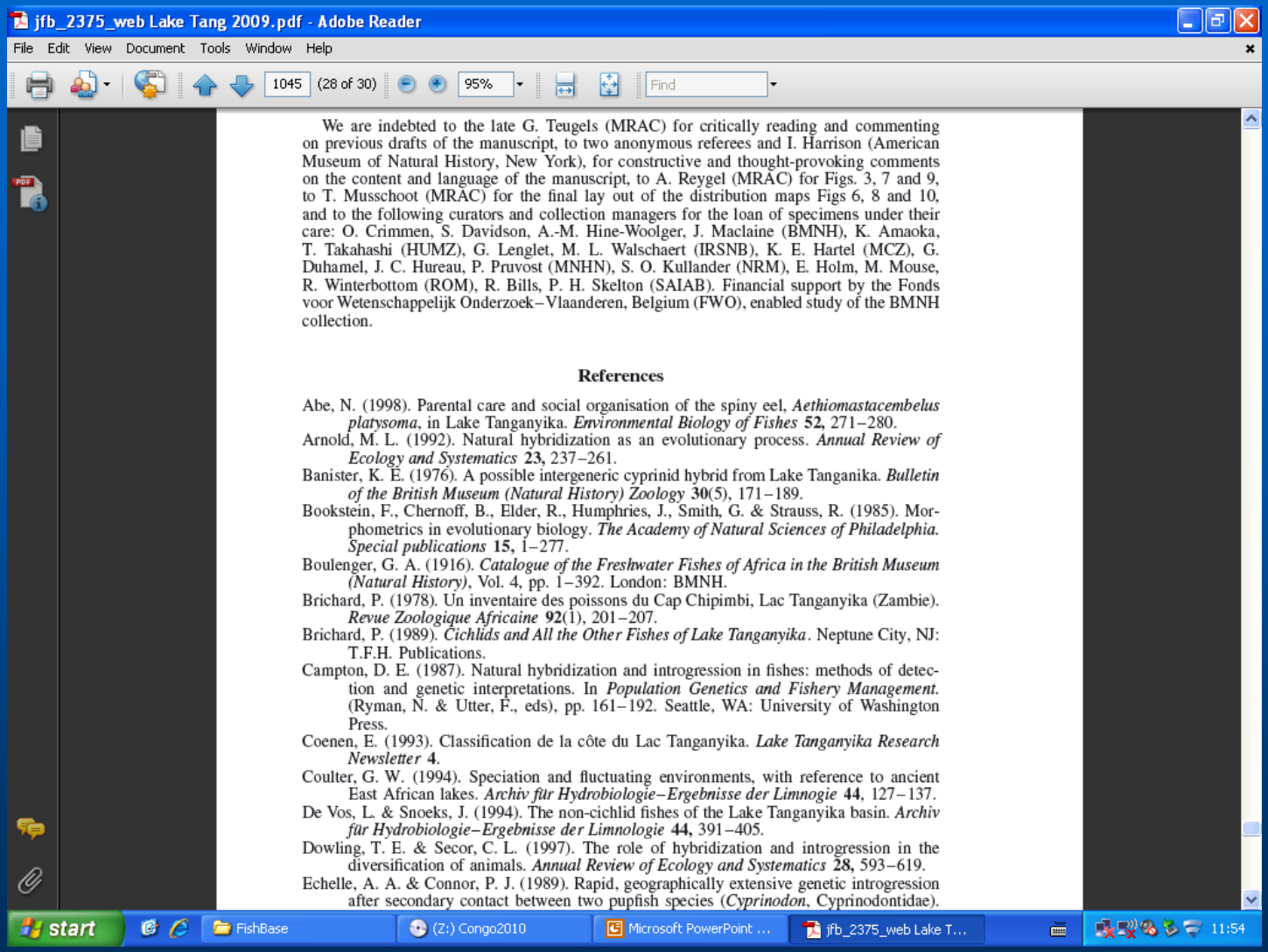

We are indebted to the late G. Teugels (MRAC) for critically reading and commenting on previous drafts of the manuscript, to two anonymous referees and I. Harrison (American Museum of Natural History, New York), for constructive and thought-provoking comments on the content and language of the manuscript, to A. Reygel (MRAC) for Figs. 3, 7 and 9, to T. Musschoot (MRAC) for the final lay out of the distribution maps Figs 6, 8 and 10, and to the following curators and collection managers for the loan of specimens under their care: O. Crimmen, S. Davidson, A.-M. Hine-Woolger, J. Maclaine (BMNH), K. Amaoka, T. Takahashi (HUMZ), G. Lenglet, M. L. Walschaert (IRSNB), K. E. Hartel (MCZ), G. Duhamel, J. C. Hureau, P. Pruvost (MNHN), S. O. Kullander (NRM), E. Holm, M. Mouse, R. Winterbottom (ROM), R. Bills, P. H. Skelton (SAIAB). Financial support by the Fonds voor Wetenschappelijk Onderzoek–Vlaanderen, Belgium (FWO), enabled study of the BMNH collection.

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Choice of the Journal

- "Obscure" journals
- Referee system
- Citation Index
- Copeia, Cybium, **Ichthyological Explorations of Freshwaters, Journal of Fish Biology, Journal of Natural History, Zoological Journal of the Linnean Society and Zootaxa** (online).
- Please carefully read the instructions to contributors / authors.

a few examples:

- Two authors: 'author' & 'author' or 'author' and 'author'

- More than two authors: *et al.*

- Roberts, T.R., 1975. Geographical distribution of African freshwater fishes. *Zool. J. Linn. Soc.*, **57**(4): 249-319.

A few examples: what is to be avoided?

Barbus new species (Type locality: Nyabarongo drainage): number of lateral line scales to the base of caudal fin 27–29 (median 28). PdL 53.1–54.5 in SL. A longer and more pointed head, HL 27.1–30.2, and BdO 22.8–24.6 in SL. Barbels generally longer with anterior one reaching posterior edge of eye orbital (or slightly beyond), while the posterior barbel usually reaching beyond the preopercle. Body colour pattern variable.

Conclusion

This study has provided additional morpho-meristic characters useful in distinguishing the two established species *B. neumayeri* and *B. pellegrini*. Specimens from the Nyabarongo drainage were morpho-meristically different as to warrant recognition as a different species; thus, a new species status *B. new species* whose type locality would be the Nyabarongo drainage is proposed.

ICZN, 1999?

A few examples: what is to be avoided?

Morphological revision of *Ichthyborus besse besse* and *Ichthyborus besse congolensis* (Pisces: Distichodontidae)

***Ichthyborus besse besse* (proposed)**

Characinus (*Ichthyborus besse*) *besse* (Joannis, 1835)

Ichthyborus besse besse (Boulenger 1909)

Ichthyborus microlepis (Gunther 1864)

Reretences

- ✓ Bailey R.G. (1994) Guide to the fishes of the River Nile in

***Ichthyborus besse congolensis* (proposed)**

Ichthyborus besse congolensis (Giltay 1930)

Ichthyborus besse congolensis (Daget 1967)

Ichthyborus besse congolensis (Fowler 1975)

Ichthyborus besse congolensis (Banister and Bailey 1979).

Description: Up to 1675mm silvery grey fish, except for the caudal fin which has worm-like lines and clear empty black circle at the base. Dark spots forming oblique lines on caudal lobes; 19-22 teeth on each side of the upper jaw; 14-18 on the lower jaw; 2 canines at the extremity of the upper jaw and 3 of the lower jaw.

Measurements: As in the type species.

Scales in lateral line scale 91-102. Dorsal fin rays 15-17 (III 19-22, in type species); anal 15-18, pectoral 13-17.

A few examples: what is to be avoided?

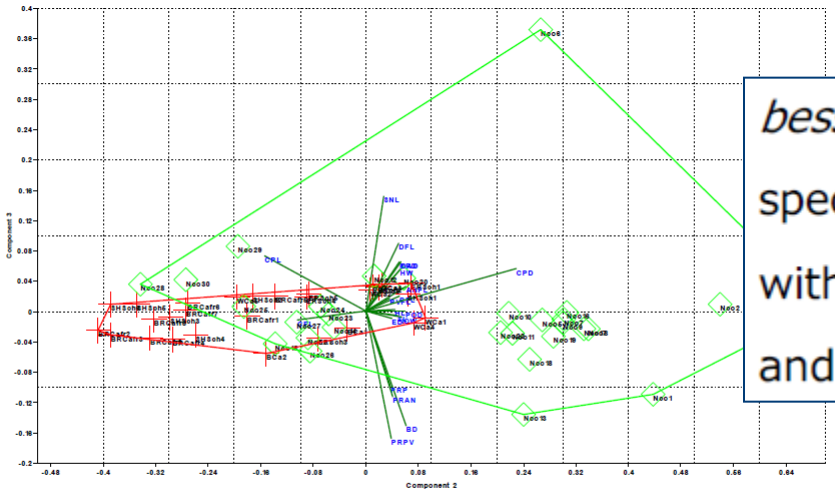

Fig. 2: The relationship of *I. besse besse* and *I. besse congolensis*, based on morphometric measurements, and the factors that have the biggest loads on their separation.

besse and *I. besse congolensis*, although few specimens of *I. besse congolensis* overlapped with specimens of *I. besse congolensis* (Fig. 2 and 3). The number of teeth in the upper jaw

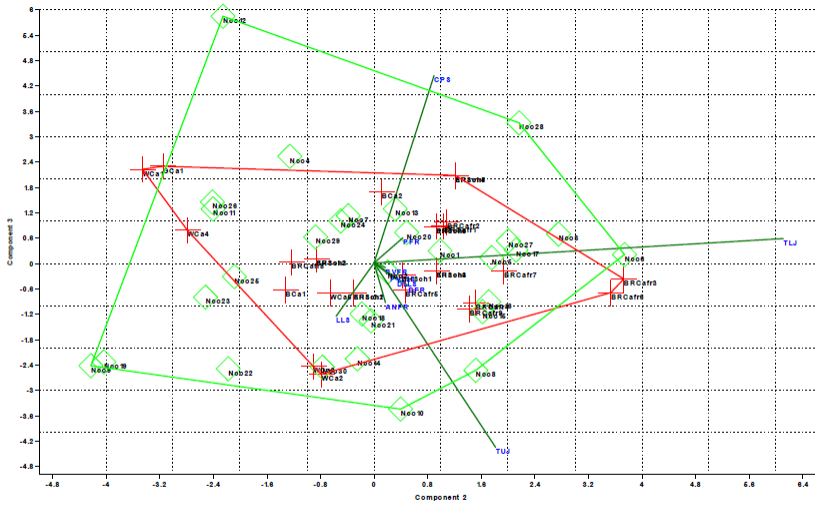

Fig. 3: The relationship of *I. besse besse* and *I. besse congolensis*, based on meristic counts, and the factors that have the biggest loads on their separation.

A few additional points to pay attention to

If you want to publish the result of your FishBase training course, please:

(1) Your work has been a collaborative effort so please contact your direct supervisor. If not available, please contact somebody else of the FishBase team or Prof. Jos Snoeks as the publication itself should also be a collaborative effort.

(2) Selection of a good journal, i.e. with referees, will be important for yourself but also for the general appeal of the work undertaken within the framework of the FishBase training program.

(3) There is the possibility to obtain a "come back" grant to further work on your case study and to prepare it for publication. Not for next year but for the year after. Maximum two candidates a year.

Additional Reading

Blanpain K. 2006. Academic Writing. A resource for Researchers. Acco.242p.