Killi-Data Wassup n°7

Overview of Killifish research output

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EDITORIAL : genus concept to be revisited?

With Killi-Data Wassup n°7, this editorial tackles a very old –old as taxonomy- issue, i.e., and an old issue that materializes differently along time.

First, to sum it up the genus concept arises with Linnaeus initial binominal nomenclature (i.e., any zoological name in 2 words, like humans, genus (= family name in humans) and species (= first name in humans… although in Asian culture first name is listed second!) and already back in the early 1770ies genus name is subject to discussions and disagreements between scientists ; since then, no agreement is found as to how to define a genus with any form of agreement (subjective or objective). And arguments of objective definitions that are based on objective criteria are actually rather subjective (to be convinced of this provocative sentence just read cases not earlier than the 1970ies (2 centuries later than Linnaeus). Scientists, then humans, are diverse by their psychology, culture (etc.) and simplistically but not caricature-wise then have been categorized into 2 extreme positions for genera as “splitters” (many genera, each with few species) and “lumpers” (few genera, with many species), the genera themselves possibly divided into subgenera (sometimes for the “splitters”, more frequently but not always for the “lumpers”) ; typically in Cyprinodontiformes those 2 extremes are represented by Lynne Parenti (lumper) and Wilson Costa (splitter) with all possible intermediate (e.g., myself as a researcher, not as Killi-Data editor, being a say 70% lumper), ending up in an unavoidable very heterogeneous global picture gathering opposite individual options.

Second the situation today is not different from the past, except that it is claimed to be based on facts, on modern evidence, and that it is constantly updated ; therefore it implies that it is true (= it pictures the truth), but even with present techniques, it is far from true : morphological and osteological techniques give distinct and even often opposite results, molecular techniques of today (more sequences) give different results from those of early times (not earlier than 1990ies!) and what we know from human (medicine) even full genome (only beginning for fishes) will not give the phylogenetic truth (and even if so who is going to derive from them new diagnoses for supposedly true molecular trees?) ; let’s push the cork further (as it is said in French), ultimately the genus could be defined objectively by full genome data AND an accepted gap between (sub)branches), i.e. a computed deviation, to be defined (alas, without diagnoses) and accepted by consensus (e.g., a given amount of distinctive sequences between 2 groups or a number of million years of separation between 2 groups, although in that latter case, consensus will be hard to fine because baselines obtained from fossils are very different from those based on palaeo-geographic events according to present knowledge) ; all 3 major databases on Cyprinodontiformes (Fishbase with “national editions”, California Catalog of Fishes, both on all fishes, and specialized Killi-Data claim to be based on evidence and constantly updated (other unlinked classifications are poorly updated… as an example, just check on the Internet the status of genus *Adinia* as valid, though (since 10 years) clearly a synonym of *Fundulus*, or the status of *Jenynsia multidentata* –a synonym- vs. *lineata*) but devil is in details as can be seen in the following examples : (1) *Rachovia* vs. *Austrofundulus* and *Aphyolebias* vs. *Moema* following synonymizations by Costa (2014), who clearly writes in

abstract (more ambiguously in text) «consequently, *Aphyolebias* and *Austrofundulus* are respectively placed in the synonymy of *Moema* and *Rachovia*», and online (today) California Catalog of Fishes approves only in part, and takes into account the second synonymization, not the first one without given reasons, but Fishbase does not follow both synonymizations and Killi-Data, likewise, does not, within an exceptional listed exception to latest evidence (for Killi-Data : http://localhost/killidataphpmysql/index.php#deviations, with given reasons such as absence of new diagnoses of redefined taxa *Austrofundulus* and *Moema*, even if those rediagnoses are announced by Costa in 2014 but never published since, unstable sub-branches with low boots strap values) ; (2) another example is now outdated : full genus status of *Tlaloc* vs. *Profundulus*, proposed by one paper, and followed continuously during the last 3 years by various authors mainly from Mexico, then Killi-Data acknowledges *Tlaloc* as a distinct full genus keeping in mind that, for decades before, papers by most authors (all Americans) and databases accept only *Tlaloc* as a synonym, then a new factor comes up, a consensus of authors from the same country or culture (even if this time Fishbase alone stills stays in old stance) ; (3) another example, the speciose livebearers genus *Poecilia* is considered to be split by several non-US researchers but when they submit an article with a new species assigned to one of the current subgenera editors and reviewers either accept it (e.g. brand new sp. *Limia islai* and *mandibularis*) or they do not accept it unless they change it for genus *Poecilia* on account that upgrading subgenera of *Poecilia* to full genera will change the genus name of the species *reticulata*, widely accepted as such (it is impossible, based on molecular results, to upgrade only one subgenus, it is only possible to upgrade all or most of them) and in this case, the 3 databases speak differently, California Catalog of Fishes and Killi-Data maintain only *Poecilia* as valid (*Limia* as a subgenus), based on latest paper (2017) by Reznick et al., whereas Fishbase considers *Limia* as a full genus ; (4) other examples, today “classical”, of speciose genera, are of the same type (upgrade all or none) e.g., *Rivulus*, *Simpsonichthys*, *Aphyosemion* ; there again Killi-Data takes into account the latest published evidence from whoever, but then because the 2 other databases have upgraded most *Rivulus* and *Simpsonichthys* subgenera immediately after Costa’s publications, it would be a lot of work for them to reverse the situation and it is hypothesized that they refrain to do so (being then detrimental to the ignored present latest authors). Then, this short overview of conflicts (gentle) in major international databases on Cyprinodontiformes shows that today’s dealing with genus concept is not different from the past, and taking decisions can only be a matter of choice, more or less objective, more or less subjective : latest published evidence with rare, listed, conservative exceptions (K-D), OR “probably” from a “ghost panel” of experts dated but unexplained analyses (CCF), OR from undated and un-sourced (but professional) neutral appraisal, possibly transversally influenced by regional constraints (FB). Then to follow only one of the 3 databases (and quoting it or not) or to derive its own systematics in case of conflicts is just a mirror of present games, claiming objectivity while being inevitably subjective!

If there is no way to find a consensus on the genus usage and no way to decide on a single genus naming for each conflicting case (and is it necessary compelling?... concerned authors themselves do not require that their results are compulsory applied because of the neutral attitude, they just want not to be ignored… and many other authors formally refuse to write articles with systematic moves at generic level because, according to them, it is useless), there is another characteristic that preclude from finding a consensus and this is purely Internet as another struggle place for dominancy (this dimension is very human, like for psychology between “splitters” and “lumpers”) ; nobody is today unaware of Internet used as a political power to influence votes, decisions, usages, societal classifications (etc.) and the genus concept is not excluded from that game with its new social networks, claimed universal databanks… and, based on a benchmark from several countries, its over dominant, nearly monopolistic, US-centered, Google search engine (Roman circus games are not far) is today biased (and faked) and the Internet arena is far from what it used to be in its early freedom days ; let’s keep all that stuff in mind and maintain at least one rule : when publishing in print or electronically, when discussing generic issues, do not quote a single database or source alone (implying this is based on supposed universality or acceptance, which is not the case in practice) but mention several sources and the reasons

given, and more importantly (and ethically) mention all available published evidence (not, opinions) and of course the latest… actually there is not a single scientist who has not had to "eat his-her hat" during life time because his-her results or those of others have changed dramatically the picture according to evolving techniques and cumulative knowledge (therefore it is not a question of opinions or selfish quarrels, it is a question of knowledge, changing and still always too poor with regards to taxonomic complexity, and let's be a bit provocative, it is even more a problem of essence since Linnean binominal nomenclature appears today a poor and artificial, though still useful (for how long?), way of naming the components of that biological complexity).

PS: due to 2 kind contributions by Georges De Roeck and Frans Vermeulen, there are back collecting trips reports in this issue, warmest thanks to both.

VIEW FROM THE CHAIR

Killi-Data Wassup n°7 contains several features that push to some comments raised from some of the selected publications in view of the translation of their results into Killi-Data, and not as opinions or judgments on the quality of those research papers.

First, the publication by Kruistum et al. on full genomes of 2 livebearing congeners *Poeciliopsis retropinna* and *turrubarensis*, one, the former, being matrotrophic (with a placenta-like process) and the other, the latter, being not (i.e., lecithotrophic) is a landmark work (because it relates molecular differences to matrotrophy-lecithotrophy index and because it discloses that the placenta-like process corresponds to gene sequences that are also found in evidently viviparous unrelated animals like mammals) ; on a morphological level, those two species are similar, but differ specifically in whether they have a placenta or not and this is reflected on genomic level ; their genomes are in general quite similar (similar repeat contents, similar genome size), but there are some specific differences between the 2 genomes (duplication of vtg protein and positive selection on certain genes) ; there is also a confirmed observation that can serve as food for thought because it over-complexifies full genome studies (without rationale, yet) : genomes of congeners *retropinna* and *turrubarensis* have similar repeat contents of 20.8% and 18.5% ; notes (from Henri van Kruistum's kind communications) : full mitogenome of those 2 species derived from the study is present in the assemblies which will be available on GenBank even if genes involved in placentation are not present on mitochondrion ; besides the authors have tested 2 machine devices (a side issue in that paper because it has no impact on results) used to sequence and assemble full genomes and both show similar results but, at time of study, with dissimilar prices ; with "10X Genomics" (https://www.10xgenomics.com/solutions/assembly/), DNA molecules are barcoded and then sequenced on an illumina machine (this barcoding information can be used to scaffold assembly) ; with "PacBio" (https://www.pacb.com/products-and-services/sequel-system/), very long reads are sequenced and this gives an even better assembly ; prices differ quite a lot per facility but "10X Genomics" is always cheaper ("PacBio" can still be beneficial as assembly quality is generally better) ; with "10X Genomics", genes are well assembled (both genomes are very complete on gene level) but very long repetitive elements can only be spanned by equally long reads ; prices are highly dependent on sequencing facility, obviously, and may have dropped considerably since actual work on study (ca. 2 years ago) ; for a small fish genome, price would be about € 3000 for "10X Genomics", and at least 3 times more for "PacBio" (rough estimates) ; today, Oxford Nanopore is an affordable alternative to those 2 sequencing techniques (market offer is moving quickly).

Second, the publication by Roth-Monzon et al. showing unexpected morpho-convergence in 3 of 4 *Poeciliopsis*, *prolifica*, *viriosa*, *latidens* if sympatric ; this is a study that uses modern techniques (to quantify body shape morphometrically the measurements are photo-scan derived using computer softwares tpsDig2

and tpsUtil, as per Rohlf [2016. Department of Ecology and Evolution, State University of New York at Stony Brook, Stony Brook, NY, USA, https://life.bio.sunysb.edu/ee/rohlf/software.html], to quantify ecological condition of light, canopy index is measured by a densitometer, to identify species published diagnoses are used and in case of doubt genetic analysis is done to confirm species ID and to separate morph variations from local ecological variations statistical techniques are used) ; surprisingly the authors stress unusual sympatry in *Poeciliopsis* congeners from northwestern Mexico but they do not mention oviparous Cyprinodontiformes where such sympatry, up to 5 congeners (in Africa or South America), is routine, and fish separate easily by male pattern which is not the case, by far, of studied females of *Poeciliopsis* (male with their distinct gonopodium are not part of study, and anyway pattern differences are not big either); the authors do not discuss possible (or putative) hybridization between the 4 species on the basis of no previous cases among them (it is the case for very special congeners not far as sp. -*lucida*, *monacha*, etc.- and their hybrid clones) ; the study compares results from collections in a single, possibly different year (i.e. no locality surveyed during 2 years or more, all localities collected only once) which may induce some heterogeneity in the results (ecological differences usually are understood as pushing to morphological divergence, however even if this is so the possible biases are going the opposite way and present results are showing convergence, not divergence) ; a leading work to be deeply analyzed with possible “me-toos”.

Third, the very comprehensive molecular survey of 22 northern populations in *Nothobranchius melanospilus* complex by Bartakova et al. shows for the first time panmixy in that genus (molecular mixing over range of various related taxa) and that could serve to a serious alert to naming of cryptic species (although general comments must not be derived from single cases) and, less surprisingly, it exemplifies that it is much more difficult to demonstrate (and to convince reviewers) that a recently named taxon (in this case *kwalensis*) is a junior synonym than to describe any new species by any author (although the present study is designed and performed before naming *kwalensis*) ; even when modern techniques are used with significant number of samples there is always something missing in order to be fully convincing of a systematic move (e.g. topotypes in the sample) ; similar cases of proposed synonymies taking much more resources than for initial naming of recent taxa are *Austrolebias apaii* vs. *bellottii* or *Austrolebias vazferreirai* vs. *cinereus* ; those are rare cases because candidate researchers for tackling those spiny –and less rewarding- issues are not many, despite the huge number of named cryptic or molecular species in the last decades ; anyway the most important result of that decisive work is panmixy that could not be anticipated for such an annual-fish case in standard coastal plain in addition to variability (will this put a halt to molecular species description?) and this gives food for thought for still enigmatic puzzles of species in Congo cuvette (*Aphyosemion elegans* group, *Epiplatys multifasciatus* group) or in Amazon basin (*Rivulus rectocaudatus* group or *Rivulus rubrolineatus* group, etc.) ; time will tell, bearing in mind that humans have always burnt their previous idols or previous fashions.

SELECTION OF PUBLICATIONS (last in, first out)

- Saint John, M.E., K.E. Dixon & C.H. Martin. [The Martin team discloses a nasal protrusion in durophagous *Cyprinodon brontotheroides* without correlation between it and snail size {durophagy refers to eating behavior of animals that consume hard-shelled or exoskeleton bearing organisms, such as corals, shelled mollusks, or crabs} ; the authors evaluate the unique morphology of that pupfish in relation to its specialized food, snails (within a twin lacustrine speciation {the other being a scale eater, *desquamator*} from a standard ancestor of *Cyprinodon variegatus* {here probably the subspecies *baconi*}, plus in-between hybrids, on San Salvador island, Bahamas ; fish consume unusual preys (e.g., mollusks) by crushing the shell to consume the soft tissue (if crushable!) or by extricating soft tissue without breaking

the shell using a method known as oral shelling ; for *Cyprinodon brontotheroides*, oral shelling is demonstrated as the typical way of feeding ; besides, a unique adaptation of head morphology -a nasal protrusion- is anatomically shown for the first time ; an adaptation for oral shelling in the durophagous pupfish (*Cyprinodon brontotheroides*) ; durophagous pupfish and their hybrids consume the most snails than other sympatric congeners, but there is no strong correlation between nasal protrusion size and maximum snail size consumed within the parental or F2 hybrid population, suggesting that size of protuberance is not relatively a major asset in oral shelling ; then the authors suggest that such specific nasal protrusion of *brontotheroides* may only increase feeding efficiency, act as a sensory organ, or is a sexually selected trait, pending further studies. 2020. JFB, https://onlinelibrary.wiley.com/doi/10.1111/jfb.14344] {Jean Huber, 12-May-2020} <°))))>< <°))))>< <°))))><

- Yogurtçuoglu, B., U. Uyan & F.G. Ekmekçi. [Yogurtçuoglu et al. compare stable (or not) conditions LHT of *Aphanius transgrediens*, with lower fecundity and larger eggs in unstable conditions ; the comparison concerns reproductive ecology in 2 contrasting habitats that differ substantially in terms of stability of environmental parameters, particularly salinity regime (stable vs. unstable) with a 12 months survey ; results suggest that reproductive effort (gonad weight) of both sexes does not differ significantly between 2 habitats, but females in the unstable habitat have significantly lower fecundity and larger eggs ; relationship between fecundity and fish size is stronger {not surprisingly) in stable habitat, whereas relationship is quite variable and uncertain in unstable habitat ; gonadosomatic index and duration of hydrated eggs show that reproduction is continued from February to May in both habitats ; however, a second spawning event is reported during July and August in unstable habitat (then with together young-of-the-year specimens and older generations). 2020. JFB, https://onlinelibrary.wiley.com/doi/abs/10.1111/jfb.14358] {Jean Huber, 4-May-2020} <°))))>< <°))))>< <°))))><
- Sowersby, W., A.V. Gonzalez & B. Rogell. [Sowersby et al. experiment on sex ratio in 15 oviparous killifish, being species dependent, with no rational on genera or annualism ; this interesting exploratory study investigates differences in sex ratios across closely related species belonging to various genera, either with overlapping or discrete generations (annual and non annual), under both solitary and social treatments while controlling for extrinsic mortality ; the concerned species are *Fundulopanchax scheeli*, *filamentosus*, *cinnamomeus*, *Nothobranchius kadleci*, *guentheri*, *Aphyosemion splendopleure*, *striatum*, *Callopanchax toddi*, *Scriptaphyosemion cauveti*, Eppiplatys *roloffi*, *Pachypanchax playfairii*, *Gnatholebias zonatus*, *Rivulus chucunaque*, *fuscolineatus*, *Nematolebias whitei* ; sex ratios can differ from an expected equal proportion of males and females (1:1), carrying substantial implications for understanding of how mating systems evolve ; results show substantial divergences in sex ratios across closely related species, which exhibited both male and female biases, however, no evidence that overlapping generations or social environment or taxonomy affects sex biases, suggesting that other factors drive the rapid evolution of sex ratios in killifishes. 2020. E.E., https://link.springer.com/article/10.1007/s10682-020-10041-5] {Jean Huber, 4-May-2020} <°))))>< <°))))>< <°))))><
- Rodriguez, R.S., P.P. Torres-Pineda & J. Josaphat. [Rodriguez et al. describe *Limia mandibularis* {K-D maintained in *Poecilia*}, a ninth morpho endemic from Étang Miragoâne, Haïti ; the new species belongs, according to the authors, subgenus *Odontolimia* {that is synonymized by authors into subgenus *Limia*, but one of them, Rodriguez, from Cuba, is undertaking a Ph.D. revision of that group in USA and a coming publication is expected to clarify the issue whenever *Limia* is considered as a full genus or only a subgenus of *Poecilia* by scientific community in the future} ; *Odontolimia* diagnosis vs. *Limia* is essentially based on preopercular pore number and on number and shape of teeth of outer and inner rows ; according to Rivas (1980), *Odontolimia* is composed of 6 species, *grossidens*, *fuscomaculata*, *garnieri*, *immaculata*, *miragoanensis*, *ornata*, all endemic to lac Miragoâne and *Limia* s.s. currently comprises 15 species

(including new *islai*); the new species, described from Étang Miragoâne in southwestern Haiti on Hispaniola island, is another component with lacustrine speciation {currently 9 sympatric congeners as *Limia* or *Poecilia* endemic to that small lake, plus a *Gambusia* sp., named *beebei*, which is, outside lago Titicaca, the lake with most intensive speciation among Cyprinodontiformes, just before Laguna Chichancanab in Mexico} ; *mandibularis* differs from all congeners by presence of a well-developed lower jaw, absence of preorbital and preopercular pores, and preorbital and preopercular canals forming an open groove each. 2020. Zootaxa, https://www.mapress.com/j/zt/article/view/zootaxa.4768.3.6] {Jean Huber, 4-May-2020} <°))))>< <°))))>< <°))))><

- Rodriguez, R.S. & P.F. Weaver. [Rodriguez and Weaver describe *Limia islai* {K-D maintained in *Poecilia*}, an eight congener from Étang Miarogoâne, Haïti {ex-Tiger *Limia* for aquarists} ; the new species described has a conspicuous barred pattern consistent in several (4 to 12) black bars along the body, like a tiger (more or less, because they are truly vertical), ray 4p serrae of the gonopodium in males with 10 segments and origin of Dorsal fin in females slightly behind of origin of Anal fin ; it is rather similar to *Poecilia nigrofasciata*, but it is not humpbacked, with a slender body, different gonopodium suspensory and by molecular data (nuclear and mitochondrial) ; *islai* further differs from *nigrofasciata* in reproductive behavior ; étang (small lake) Miarogoâne is confirmed as an important lacustrine center of endemism for livebearers with a total of eight endemic species described so far {new mandibularis, not taken into account}, about the same as Laguna Chichancanab, in southeastern Mexico, for genus *Cyprinodon*, in oviparous Cyprinodontiformes {notes : the authors do not discuss the validity of previous taxa from Miragoâne and related regions, including in Santo Domingo part of the large Caribbean island, this is assumed as future work to be part of first author's Ph.D. thesis ; the authors do not discuss either the systematic status of *arnoldi*, an old aquarium import, considered as a junior synonym of *nigrofasciata*, since 1963 ; the date of publication for ICZN availability is not 100% precise, probably mid-March, then if so there is no conflict of anteriority with the same name published along description of *mandibularis* and if the contrary to consider *islai* as available from that latter publication would be "couper les cheveux en quatre" as it is said in French -splitting hairs}. 2020. JFB, https://onlinelibrary.wiley.com/doi/abs/10.1111/jfb.14301] {Jean Huber, 26-April-2020} <°))))>< <°))))>< <°))))><
- Nagy, B., Watters, B.R., van der Merwe, P.D.W., Cotterill, F.P.D. & Bellstedt, D.U. [Nagy et al. describe 6 *Nothobranchius*, *albertinensis*, *attenboroughi*, *hoermanni*, *itigiensis*, *moameensis*, *venustus* (*ugandensis* group) ; the authors now fully split the *taeniopygus* group into 2 species groups with probable components as (1) *angelae*, *bellemansi*, *ivanovae*, *neumanni*, *nubaensis*, *ottoschmidti*, *robustus*, *rubroreticulatus*, *rungwaensis*, *sagittae*, *seegersi*, *serengetiensis*, *skeltoni*, *sonjae*, *steinforti*, *taeniopygus*, *taiti*, *usanguensis*, a group named *taeniopygus* and (2) *albertinensis*. *attenboroughi*, *derhami*, *hoermanni*, *itigiensis*, *kardashevi*, *moameensis*, *streltsovi*, *torgashevi*, *ugandensis*, *venustus*, a group named *ugandensis* ; the *ugandensis* species group is distributed parapatrically from the inland plateau of Kenya, Tanzania and Uganda ; its members are characterized in male by a light blue body coloration with red to red-brown scale margins, a frontal part of head red-brown, a throat light blue or red, a uniform red or yellow Caudal fin and a light blue or yellow Anal fin with red-brown spotted pattern ; based on molecular data and morpho diagnoses, 6 new species are newly named and they (plus 5 already named taxa) are compared by male live pattern in a key and diagnostic chart-table ; male of *Nothobranchius albertinensis*, from Albert Nile drainage in western and northwestern Uganda, has a yellow Dorsal fin with bands in medial part parallel to fin rays, yellow Anal fin without markings and a negative D/A ratio (previously aquarium populations tagged Lake Albert, Moyo, Olobodagi, Pakwach) ; male of *Nothobranchius attenboroughi* from Grumeti and other lesser systems east of Lake Victoria in northern Tanzania, has a light blue Anal fin with red-brown dots proximally and medially, becoming yellow distally with narrow red-brown stripes parallel to fin rays (previously aquarium populations tagged Ikoma, Lake Victoria in part,

Motukeri, Mugeta, Nata) ; male of *Nothobranchius hoermanni* from the upper Wembere drainage in central Tanzania, has a red throat, light blue Anal fin with red-brown spots and bands proximally and medially, and a broad light blue distal zone without markings, plus Pectoral fins hyaline with red-brown bands parallel to fin rays and exposed branchiostegal membrane red-brown, with cream distal margin ; male of *Nothobranchius itigiensis* from the uppermost Ruaha drainage and the Bahi Swamp area in central Tanzania has a yellow Anal fin with red-brown spots proximally, that merge medially to a pattern parallel to fin rays and are fused distally to form a marginal band (previously aquarium populations tagged Itigi, Lake Victoria in part, Tangawizi) ; male of *Nothobranchius moameensis* from the Moame system south of Lake Victoria in northern Tanzania, has a light blue Anal fin with red-brown dots proximally and medially, and with light blue or yellow distal zone without markings (previously aquarium populations tagged Lake Victoria in part, Runere) ; male of *Nothobranchius venustus* from lesser systems in south-western Lake Victoria basin in northwestern Tanzania has a Dorsal fin with a narrow light blue subdistal band and a narrow red-brown to black distal band, a light blue Anal fin with irregular red-brown stripes perpendicular to fin rays proximally and medially, and orange with red-brown stripes parallel to fin rays in distal zone {unfortunately no color variation is analyzed for those 6 new taxa and their counterparts, but a morphometrical analysis with first and second principle components is given, based on based on the Mann-Whitney U-test with sequential Bonferroni correction} ; 4 closely-related species (*derhami*, *attenboroughi*, *moameensis*, *venustus*) occur in allopatry around Lake Victoria in Tanzania and Kenya ; a special note is given on *Nothobranchius robustus* which according to the authors do not belong to either 3 related species groups, namely *taeniopygus*, *neumanni* and *ugandensis* ; in total, all known members in *ugandensis* species group are molecularly studied with live patterns and distributions in this very comprehensive and remarkable team work. 2020. I.E.F., https://pfeil-verlag.de/publikationen/review-of-the-nothobranchius-*ugandensis*-species-group-from-the-inland-plateau-of-eastern-africa-with-descriptions-of-six-new-species/] {Jean Huber, 25-April-2020} <°))))>< <°))))>< <°))))><

- Esmaeili, H.R., A. Teimori, F. Zarei & G. Sayyadzadeh. [Esmaeili, Teimori and coll. propose DNA bar-coding review of 16 species of *Aphanius* and new genus *Paraphanius* (*mento* group) ; killifishes, previously in genus *Aphanius*, are relicts of ancient ichthyofauna of Tethys Sea and today whole members of the family Aphaniidae {not accepted by all authors} ; present molecular results support distinction of 3 major clades related to 3 genera within this family ; (1) the first, basal, clade includes *mento* group which are placed in a new genus, *Paraphanius*, found in the Orontes (= Asi) and Tigris-Euphrates River drainage, the Levant in coastal waters and the Dead Sea basin, western Jordan, and in southern Turkey in the Mediterranean basins as well as in central Turkey {abbreviated no better than 'Paraph.' in Killi-Data}, (2) the second clade contains the *dispar*-like brackish water tooth-carps which are transferred to genus *Aphaniops* {abbreviated no better than 'Aphops.' in Killi-Data}, distributed in the coastal waters around the Red Sea and the Persian Gulf basins, (3) the third clade, the remaining genus *Aphanius* in new restricted sense contains all inland and inland-related tooth-carps, which are mainly distributed in the inland waters in Turkey and Iran and also in the inland-related drainages around the Mediterranean basin ; this study with description of new genus *Paraphanius* as a split for *Aphanius mento* and related species is derived from findings dated already in the 1980ies (e.g. by Parenti) ; based on molecular data (DNA bar-coding), the authors then split *Aphanius* into 3 genera *Aphanius*, *Paraphanius* and *Aphaniops* (previous named as a genus and seen either as a subgenus or, mostly, a junior synonym of *Aphanius* {they do not discuss the 3 other previously considered as valid subgenera, *Anatolichthys*, *Kosswigichthys*, *Tellia*, they seem to consider them at least temporarily as synonyms of *Aphanius*, but conservatively those, including *Aphanius* s.s. are maintained with their diagnoses in Killi-Data} ; besides the authors consider *alexandri*, *mentoides*, *orontis*, *similis* and an un-named population from Syria as valid species, distinct at least molecularly from *mento* and do not discuss the status of *striptus* {but they fail to propose new diagnoses for them and herein they are kept as junior synonyms of *mento*} ; this major systematic change is not a surprise following previous molecular

results (e.g., Hrbek, T., F. Küçük, T. Frickley, K.N. Stölting, R.H. Wildekamp & A. Meyer. 2002. Molecular Phylogeny and historical Biogeography of the *Aphanius* (Pisces, Cyprinodontiformes) species Complex of central Anatolia, Turkey. Mol. Phylogenet. Evol., 25: 125-137, 5 figs., 2 tabs.) {however, it is not known if in the future the authors' strategy of keeping 3 genera and no subgenera will be accepted by other specialists (including Turkish and German), other extreme alternatives would be only 1 genus with 1 more subgenus, revalidation of *Aphaniops* as a subgenus and previous valid subgenera maintained (lumper) or all valid generic names upgraded to full genus status (splitter), with intermediate strategies}. 2020. PlosOne, https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0231717] {Jean Huber, 17-April-2020} <°))))>< <°))))>< <°))))><

- Tatarenkov, A., Earley, R.L., Taylor, D.S., Davis, W.P. and Avise, J.C. [Tatarenkov et al. disclose extensive hybridization and past introgression between populations of *Kryptolebias marmoratus* and allied ; this is a follow-up of previous works by the same American team (California and Florida) under leadership of Andrey Tatarenkov ; herein a new hypothesis is tested, hybridization within a contact zone on San Salvador island, by molecular data (with possibility of secondary introgression) , 2 mixed populations are identified, one of which encompassing sexually mature hybrids ; distribution of heterozygosity at diagnostic microsatellite loci in hybrids shows that 1 hybrid is an immediate offspring from a crossing between northern *marmoratus* and a component of Central clade, whereas remaining 5 hybrids are products by self-fertilization for 1-3 generations following initial crossing ; 2 hybrids have mitochondrial haplotypes of *marmoratus* and remaining 4 hybrids have a haplotype of Central clade, indicating that hybridization goes in both directions ; in hybrids, alleles of parental lineages are represented in equal proportions suggesting lack of recent backcrossing to either of 2 parental lineages ; however, sympatric populations of 2 lineages are less diverged than allopatric populations, which is consistent with introgression {all in all a very complex pattern} ; as a provisional conclusion, in prospect, the authors envisage, but do not firmly propose, pending future works, a single species, *marmoratus*, subdivided into 4 valid subspecies, namely *marmoratus*, *heyei*, *bonairensis* and *hermaphroditus* {but this is different from their previous guess-proposals and they do not discuss the *caudomarginatus-ocellatus* case}. 2020. JEB, https://onlinelibrary.wiley.com/doi/abs/10.1111/jeb.13624] {Jean Huber, 10-April-2020} <°))))>< <°))))>< <°))))><
- Bragança, P.H.N., R.M. van Zeeventer, R. Bills, D. Tweddle & A. Chakona. [Bragança et al. review *Lacustricola johnstoni*, mayposae and a possible new sp., with lectotype designations (genetics, distribution) ; this is a molecular study part of Bragança's post-doc work in South Africa biological lab ; anticipating a further systematic split, the authors use "*Lacustricola*" (between quotes) for the herein studied species because the type-species of *Lacustricola*, *pumilus* (= true *Lacustricola*) belongs to a distinct molecular group ; 2 species are redescribed, "*Lacustricola*" *johnstoni* and "*Lacustricola*" *myaposae*, based on topotypes ; detailed data on osteology and life color pattern are presented for the first time ; "*Lacustricola*" *johnstoni* is herein considered as widespread in the Okavango, Zambezi, southern Africa east coastal drainages and the Bangweulu in the Congo system ; "*Lacustricola*" *myaposae* is herein considered to be endemic to the small coastal river drainages in KwaZulu-Natal Province, South Africa {therefore collections outside that region near coasts of East Africa are considered to belong to another species) ; lectotypes for both species are designated ; a new, still un-named species from the Lualaba River in Congo basin, related to *macrurus* is identified, a species aff. *johnstoni* (from Okavango basin) appears also dictinct in the molecular tree, related to *centralis* (sympatric and similar to *myaposae*), the species *mediolateralis* is very closely related to *katangae* (with similar pattern), the species *hutereaui* is homogeneous and distinct {but it is not known if the authors have or will have sample specimens from northern Zaïre that are claimed as distinct by Wildekamp) and the deep bodied *jubbi* is considered to be related to a clade including both *johnstoni* and *myaposae*. 2020. ZK, https://zookeys.pensoft.net/article/48420/] {Jean Huber, 2-April-2020} <°))))>< <°))))>< <°))))><

- Ramirez A.G., K. Piller, J.P.H. Ramirez, M.N. Medina, R.M. Hernandez & O.D. Dominguez. [Ramirez et al. report 2 years LHT *Goodea atripinnis*, *Ameca splendens*, *Zoogoneticus purhepechus*, in rio Teuchitlan ; all 3 species are routinely sympatric in that river basin (all but one are endemic) ; results of this study have important conservation implications and can be used to support specific conservation actions ; during a survey with samples of several hundred specimens among 3 species over 24 months, data on fertility output, size at first maturity (L50), sex ratio, gonad maturity stage, and gonadosomatic index are gathered ; endemic species (*splendens* and *purhepechus*) show lower abundance downstream with 2 reproductive periods (January through March and July through September) ; sex ratio is equilibrated and fertility is lower compared to other species from other river basins ; native species are associated with clean, deeper waters that present higher dissolved oxygen and a neutral pH (with, alas, anthropogenic activities going the other way). 2020. AZP, https://www.aiep.pl/volumes/2020/1_1/txt/txt_01.php] {Jean Huber, 31-March-2020} <°))))>< <°))))>< <°))))><
- Masoudi, M., H.R. Esmaeili, A. Teimori, M. Ebrahimi, M. Seifali. [Masoudi et al. show otoliths of hybrids of *Aphanius farsicus* and *sophiae*, as intermediate between parents, whatever sex (not scales) ; hybrids of male *farsicus* with female *sophiae* (both related and from Iran) have otoliths with long and pointed rostrum bearing a narrow depression in the middle of the ventral rim ; reversally hybrids of female *farsicus* with male *sophiae* have otoliths closer to male *sophiae* ; the otolith contour of hybrids are intermediate to parents ; the authors do not exclude that some variations observed in otoliths of *Aphanius* species may result from hybridization notably when they are sympatric or have geographic overlap ; and of course the study has conservation implications (putative introgression) bearing in mind that *farsicus* is strongly endangered. 2020. A.Z., https://onlinelibrary.wiley.com/doi/abs/10.1111/azo.12326] {Jean Huber, 24-March-2020} <°))))>< <°))))>< <°))))><
- Hagmayer, A., A.I. Furness, D.N. Reznick, M.L. Dekker & B.J.A. Pollux. [Hagmayer et al. show degree of placentation is positively influenced by predation risk {another adaptable character like annualism}, at least in *Poeciliopsis retropinna* from Costa Rica ; this is a sub-product study of Pollux team on *retropinna* and *turrubarensis*, published just before ; for *Poeciliopsis retropinna*, in Costa Rica, there is a substantial variation in degree of placentation among natural populations associated with predation risk ; females from high predation populations have significantly higher degrees of placentation compared to low predation females, while number, size and quality of offspring at birth remain unaffected {Reznick team has serially published previously on observational variation in placentation according to species in Poeciliidae, showing that it is a variable character, to the contrary to Goodeidae, other livebearing Cyprinodontiformes, but this study introduces another component in variation, predation}. 2020. E.L., https://onlinelibrary.wiley.com/doi/full/10.1111/ele.13487] {Jean Huber, 20-March-2020} <°))))>< <°))))>< <°))))><
- Costa, G.C. & I. Schlupp. [Costa (GC) and Schlupp determine origin of *Poecilia formosa* as (rare) asexual hybrids formed 125 KYA in small area near Tampico, Mexico ; a clear and solid work showing asexual hybrids representing *Poecilia formosa* (disclosed in 1932, with gynogenesis) are established through hybridization since ca. 125 000 years, in a relatively small area near Tampico, Mexico, as a rare event, based on natural hybridization of *Poecilia mexicana* (maternal) and *Poecilia latipinna* (paternal), both of which are still extant [today range of *formosa* is rio Nueces and rio Grande valley in South Texas and throughout northeastern Mexico, reaching the mouth of rio Tuxpan as its southern limit, according to the authors]. 2020. BJLS, https://academic.oup.com/biolinnean/advance-article-abstract/doi/10.1093/biolinnean/blaa010/5753386] {Jean Huber, 5-March-2020} <°))))>< <°))))>< <°))))><
- Collier, G.E. [Collier reports on karyotype of *Scriptaphyosemion wieseae* as n=19 with 22 arms in comparison to congeners and compare distributions ; the author reports on karyotypes of *Scriptaphyosemion wieseae* as n=19 with 22 arms, of *etzeli* (2 populations), of *geryi* (1 more population),

of sp. Guinea {unidentified} and of *cauveti*, and discuss other published reports for congeners (notably by Scheel). The discussion focuses on methods of processing karyotypes, modern vs. old and on {poorly known} distribution of related *wieseae* {misprinted weiseae}, *bertholdi* and *chaytori* {Jean Huber, personal synthesis, February 2020}. 2020. JAKA, http://www.killi-data.org/registration.php] {Jean Huber, 19-February-2020} <°))))>< <°))))>< <°))))><

- Roth-Monzon, A.J., M.C. Belk, J.J.V. Zuñiga & J.B. Johnson. [Roth-Monzon et al. show unexpected morpho-convergence in 3 of 4 *Poeciliopsis*, *prolifica*, *viriosa*, *latidens* (not *presidionis*) if sympatric ; hypothesis is that sympatric congener competition is a central force in shaping evolution, and at least morphometry, particularly through character displacement ; surprisingly, convergent character displacement is found in populations of *prolifica*, *viriosa* and *latidens*, but that convergence in body shape is not consistently in same direction (when 3 or more competitors co-occur, more extreme body shapes are not disclosed, compared to when there were only 2 sympatric competitors, and intermediate body shapes are found instead) ; among the 17 sampled distinct localities (in different years), canopy cover varies from 36% to 100%, stream slope from 1 to 22.5, water temperature from 23.3°C to 30.1°C, pH from 6.96 to 8.42, conductivity from to 134 to 1186 µS/cm. 2020. A.N., https://www.journals.uchicago.edu/doi/pdfplus/10.1086/708513] {Jean Huber, 12-February-2020} <°))))>< <°))))>< <°))))><
- Jiménez, P.P., Vasquez, F., Rodriguez, D.O., & Taphorn, D.C. [Taphorn team reports effects of introduced *Poecilia gillii* on *Pseudopoecilia fria* (local displacement, morph changes) since only 2011 ; the detrimental effects of invasive live bearers species on local fish fauna is routinely studied since decades, notably when oviparous Cyprinodontiformes are concerned ; the present study is a little different since it monitors the short term effects of invasive and introduced livebearer *Poecilia gillii* on another livebearer *Pseudopoecilia fria* in coastal rivers of Choco region, in Ecuador ; and {unfortunately, no surprise} results show a displacement of *fria* towards upper part of river basins of its range, acceleration in its growth and therefore an earlier sexual maturity with a decrease in body size and finally a change in body depth. 2020. RBT, https://revistas.ucr.ac.cr/index.php/rbt/article/view/36000/41225] {Jean Huber, 2-February-2020} <°))))>< <°))))>< <°))))><
- Kruistum, H. van, M.W. Guernsey, J.C. Baker, S.L. Kloet, M.A.M. Groenen, B.J.A. Pollux & H.-J. Megens. [Pollux team shows genome of matrotrophic *Poeciliopsis retropinna* includes placenta-related sequences (not in lecithotrophic *turrubarensis*) ; based on hypothesis that placenta is accompanied by rapid evolution of genes involved in processes that regulate mother-offspring interactions during pregnancy, the authors compare 2 congeners {but not closely related, former being today a member of *Aulophallus* subgenus, latter being of nominotypical subgenus} ; *retropinna* being strongly matrotrophic {according to Reznick's index} it is a particularly interesting model for placenta evolution, because in genus *Poeciliopsis* a placenta has evolved independently from mammalian placenta ; the authors apply different assembly strategies for each species : PacBio sequencing for *retropinna* (622Mbp assembly, contig N50 of 21.6 Mbp) and 10X Genomics Chromium technology for *turrubarensis* (597Mbp assembly, contig N50 of 4.2Mbp), but that decision has not biased results ; precisely study shows rapid evolution in major parts of several molecular pathways involved in parent-offspring interaction in *retropinna*, but not in *turrubarensis*. 2020. MBE, https://academic.oup.com/mbe/advance-article/doi/10.1093/molbev/msaa011/5711300] {Jean Huber, 26-January-2020} <°))))>< <°))))>< <°))))><
- Rodriguez R.S., P.P. Torres Pineda, C.M. Rodriguez & I. Schlupp. [Rodriguez et al. report 2 locations of *Limia yaguajali* {K-D maintained in *Poecilia*} from Santo Domingo, sympatric with 3 congeners… Previously the species is only known from type locality and no other researcher has studied it since description by Rivas, in 1980 ; the article is comprehensive with live pattern photos of both sexes, some morphometrics, ecological data and 3 other sympatric congeners *Poecilia zonata*, *hispaniolana* and *dominicensis* (sensu Valenciennes), plus alas, introduced Guppies (*reticulata*) and Green Swordtail (*Xiphophorus hellerii*) ; note

: the authors use genus *Limia* as valid opposite to latest evidence and they may produce new evidence for this in the future since it seems the beginning of an in-depth coverage of Cyprinodontiformes fauna in Santo Domingo state (eastern part of Hispaniola island, Caribbean arch). 2020. N.C., https://novitatescaribaea.do/index.php/novitates/article/download/221/207] {Jean Huber, 22-January-2020} <°))))>< <°))))>< <°))))><

- Vermeulen, F. & D. Mejia [Collecting trip to Peru and Colombia (field code: PERU-COL VM 2019 -) ; the time spent collecting in Peru was from 10 November till 21 November. In the days after the Peru travel we collected in various regions in Colombia till 27 November 2019 ; the expedition was undertaken with the help and assistance of Daniel Mejia, Bogota, to sample annuals like *Moema*, *Aphyolebias* and the non-annual genus *Rivulus* in Peru in areas seldom sampled ; the first selected area was Tarapoto a town situated in-between two mountain ranges ; we did collect *Rivulus* aff. *rubrolineatus* near the town ; In order to find other species we had to cross the mountain to the east and were lucky to discover a *Rivulus*, unknown to science, near Yurimaguas ; in general the area seems poor of Cyprinodont fish variation ; the visit to Iquitos did bring new *Rivulus* from Napo River about 200 km upstream, the area around Iquitos itself did bring known species like *Moema*, *Aphyolebias* and *Rivulus* ; despite the fact that the rainy season ended early in 2019, which was not in favor for finding annuals, we were able to collect some annual species ; as soon as data are evaluated I will report in detail about these ; interestingly we travelled over the Amazon River from Iquitos by a fast ferry boat in 13 hours to Leticia in the southernmost tip of Colombia ; in the Colombian part of the travel we went collecting by car to places I went in the years before with the purpose to collect more material for proper description of the new species found ; we drove to Mocoa in the west, to Puerto Lopez to the east and to Aguazul at the eastern Corderilla ; we discovered *Micromoema* aff. *xiphophora* near San José del Guaviare, a town in the center of Colombia far from its known range around Puerto Ayacucho, Amazonas dpt., Venezuela ; this species was never reported in Colombia ; *Micromoema xiphophora* can show various color patterns and shapes of the Caudal fin that can vary between lyretail shape, single sword-shaped and caudal with lancet shape and can show all these varieties within the same population ; we only could retrieve one male and one female and the male shows a lyre tail, but this is not necessarily a stable character for this population as you can imagine ; we also did find *Renova oscari* again but *Terranatos dolichopterus*, found earlier on that same location was not present this time ; a remarkable fact is that exactly these 3 taxa live also together at their Venezuelan biotope on Isla Raton, at about 620 kilometer distance in straight line (approx. twice that distance over the river way) ; also we were able to discover a most southern habitat of *Rachovia brevis* ever reported in the Magdalena area at 3.45 degrees north of the equator ; some months before this expedition was started my travel companion Daniel Mejia was able to locate- and collect live material from *Rivulus boehlkei*, never seen alive since its first discovery by Prof. James E. Bölke et al. in 1973 described by Huber & Fels in 1985 ; he kept these fishes alive for further study and handed them over to me for reproduction at my home on Aruba ; thanks to the professional care by my friend and fish-exporter Harol Sanchez in Bogota I was able to bring all species back home by the use of legal export- and import papers and a shipping agent. 2020. Frans Vermeulen pers. comm., unpublished] {Jean Huber, 20-January-2020} <°))))>< <°))))>< <°))))><
- Dutra, R.T., J.A. Bitencourt, M.R.C.B. Netto, F.G. Paim, L.M.S. Sarmento & P.R.A.M. Affonso. [Affonso team confirms high karyotypical and molecular variation in *Hypsolebias* {K-D maintained in *Simpsonichthys*} *flagellatus* and *janaubensis*. The authors detail the karyotype structure of 2 populations identifiable to *flagellatus* and *janaubensis* (cryptic sp. of the *flavicaudatus* superspecies) with same diploid number (n= 24) but distinctive formula of NF (fundamental number of metacentrics, submetacentrics and subtelocentrics-acrocentrics), the former with 12m + 24sm+12st/a (NF= 84) and the latter with 12m+28sm+8st/a (NF= 88) ; besides, despite similar distribution of heterochromatin and 5S rDNA, the karyotypes are different probably as a result of pericentric inversions {like Scheel demonstrates routinely

during the 1960ies for African annual and non-annual killifish and some South American species ; in addition, there are differences in molecular sequences (18S rDNA) {a technique not accessible to Scheel during the 1960ies} ; the author conclude that cytogenetic variation is closely associated with speciation in Aplocheiloidei (Rivulidae and Nothobranchiidae). 2020. Zeb, https://www.liebertpub.com/doi/abs/10.1089/zeb.2019.1822] {Jean Huber, 17-January-2020} <°))))>< <°))))>< <°))))><

- Raymond Merckx, Peter Van Neck, Ludo Van Donnick & Georges De Roeck [Collecting trip to Guyane, i.e. French Guyana, in October-November 2019 (2 weeks) ; we are a group of aquarists who regularly go out to catch fish and this time our goal is to collect *Laimosemion xiphidium* {K-D maintained in *Rivulus*} and look to color variations ; catching fish in their natural environment is a must to grow them into adult specimens at home in the most faithful possible environment, then optimally to perceive the variety of colors and try to find an explanation for the dominant colors ; by using a normal car, only the first passable parts of Route de Belizon and Route de Nancibo are our limits (maybe next time with a 4 x 4 drive, then!) ; this time, for collections of juveniles and subadults *xiphidius*, we notice large differences in colors of Dorsal and Anal fins, while their bodies themselves either show dull or bright color patterns until young fish grow to fully adult stage here in Belgium ; other collected killifish : *Laimosemion agilae* {*Rivulus agilae*}, *Laimosemion geayi* {*Rivulus geayi*}, *Laimosemion cladophorum* {*Rivulus cladophorus*}, *Poecilia vivipara, Poecilia parae* (yellow and white color phases), *Anablepsoides igneus* {*Rivulus igneus*}, *Anablepsoides lungi* {*Rivulus lungi*}, *Fluviphylax palikur*, *Pyrrhulina filamentosa* (in Characiformes), *Copella arnoldi* (in Characiformes), *Apistogramma gossei* (in Cichlidae) ; in total 21 killifish localities, all with water pH less than or equal to 6.0 and all with water and air temperatures remarkably stable over day time, resp. 25°C-26°C (exceptionally 28°C) and 31°C-33°C ; other chemical measurements are close to zero for KH and GH hardnesses and for NO2 and NO3, except in 1 case for GH, not surprisingly when more opportunistic *agilae* is sympatric with the 2 *Poecilia* sp. ; very frequently *xiphidius* and *agilae* (or *geayi*) are sympatric, and even once *cladophorus* joins them ; in one locality, the rarely collected sp. *Fluviphylax palikur* is sympatric with *agilae* and *vivipara*. 2020. Georges De Roeck pers. comm., unpublished] {Jean Huber, 16-January-2020} <°))))>< <°))))>< <°))))><
- Bartakova, V., B. Nagy, M. Polacik, R. Blazek, H. Lamtane & M. Reichard. [The Reichard team molecularly shows panmixy in 22 populations *Nothobranchius melanospilus*, with *prognathus* and *kwalensis* as probable synonyms ; this is a major molecular study of 83 specimens from 22 populations for COI mitochondrial sequence and 251 specimens from 16 populations for 10 nuclear microsatellite markers ; results presents 5 lineages with a clear phylogeographic structure based on at least 5 refugia but with frequent secondary contacts (ending up in panmixy) and show that main {present} river channels do not form apparent barriers to dispersal ; from upper Wami basin, *Nothobranchius prognathus* Costa, 2019, is recently described and from southeastern Kenya *Nothobranchius kwalensis* Costa, 2019, is recently described, both as cryptic sp. of *melanospilus*, based on preserved material only ; the present study designed and performed before those descriptions is not congruent with those 2 descriptions alone because, if molecular data are only considered, not less than 5 species would be concerned {if recently Wildekamp has shown that *prognathus* is a nomenclatural error and an automatic synonym of *melanospilus* s.s., the case of *kwalensis* is not simple because Bartakova studies a sample as molecularly distinctive, but this sample is not topotypic and more work is needed} ; note : in this issue (Garcia et al.), another work based on Cuban populations of *Gambusia* show similar molecular results, i.e., 5 phylogenetic groups while only 2 of them are today named and accepted since long, but the authors do not say if they will name or not those 3 remaining groups. 2020. BMC, https://bmcevolbiol.biomedcentral.com/articles/10.1186/s12862-019-1549-2] {Jean Huber, 7-January-2020} <°))))>< <°))))>< <°))))><

- Bennemann, A.B.A. [Bennemann reports on food of *Kryptolebias hermaphroditus* {K-D as a junior synonym of *ocellatus*} as very diversified like *marmoratus* ; the study, based on stomach contents, confirms numerous similar studies on related -and sometimes seen as identical- *marmoratus* (both being the only known self-fertilizing vertebrates, with an amphibious habit with high tolerance to hypoxia, skin breathing capacity, and long periods of desiccation) ; 70 specimens from drought season and 70 others from rainy season are collected from mangroves of Rio Grande do Norte state (from the Ceara-Mirim and Curimatau rivers) ; items of plant origin, mollusks, crustaceans, micro-crustaceans, insect larvae, and adult insects are counted ; {obviously} results show that in rainy season, items are more varied and more quantitative. 2019. B.Th., https://monografias.ufrn.br/jspui/bitstream/123456789/10217/1/tcc_bczm.pdf] {Jean Huber, 25-December-2019} <°))))>< <°))))>< <°))))><
- Garcia, E.M., J.L. Ponce, M.A.C. Gutiérrez, A.S. Michel, I. Germon & D. Casane. [Erik Garcia et al. confirm molecular separation of *Gambusia punctata* and *rhizophorae*, and disclose 3 putative new congeners in Cuba ; the molecular study, based on dozens of populations, uses cytochrome b gene (cytb) partial sequences and these microsatellite loci to analyze population structure inside putative species ; results disclose 5 mtDNA well-differentiated haplogroups, 4 of them also identified by analysis of microsatellite polymorphism, which corresponds to 2 already recognized as valid and named species, *punctata* and *rhizophorae*, and 3 putative, yet un-named new species ; besides, no correlation between species delimitation and level of salinity is disclosed (*rhizophorae* being a mangrove sp.), but extent of hybrid zones between those 5 groups is also reported and discussed ; geographic distribution of the 5 groups suggests a strong association with Cuban Archipelago major relict territories periodically joined or split-up by changes in seawater levels and land uplifts {in the paper the authors do not state their intentions whether they plan or not to name those 3 molecular sp.}. 2019. MPE, https://www.sciencedirect.com/science/article/abs/pii/S1055790319302222] {Jean Huber, 18-December-2019} <°))))>< <°))))>< <°))))><

Lyons, J., K.R. Piller, J.M.A. Artigas, O.D. Dominguez, P. Gesundheit, M. Köck, M.N. Medina, N.S. Mercado, A.G. Ramirez & K.M. Findley. [Lyons et al. detail distribution and past, present and trend conservation status {alarming} of livebearing Goodeidae in Mexico ; current distribution of ca. 40 accepted species of splitfins all from Mexico are reviewed {the number of valid species and genera is discussed by authors outside Mexican circles due to established polymorphism described} ; a total of 84 Evolutionarily Significant Units {E.S.U., i.e. populations that are nearly-impossible-to-separate by standard morphological criteria, but with molecular divergence} is exemplified among those ca. 40 species, after detailed samples during decades {by a bunch of volunteers} ; among 72 non-extinct E.S.U., 29 should be considered as critically endangered, 21 as endangered, 18 as vulnerable, and only 4 as least concern ; the authors recommend 3 strategies of conservation : protect best-quality remaining habitats solidly dwelt by Goodeinae populations, restore degraded habitat and re-introduce species where practical, and establish captive populations to ensure continued survival of as many species as possible {unfortunately trends during last 20 years do not speak for optimism in their conservation and, very sadly because of lack of resources and of political support, it is unlikely that in median to long term most species become extinct}. 2019. Zookeys, https://zookeys.pensoft.net/article/38152/] {Jean Huber, 24-November-2019} <°))))>< <°))))>< <°))))><

DATA WASSUP : PRINCIPLES, DISCLAIMERS AND LIMITED RESPONSIBILITY

Killi-Data Wassup is a service of information to members that does not aim to be comprehensive of whole Killifish research output (it presents only a subjective selection of articles, primarily those being coherent with

Killi-Data focus on names, systematics and nomenclature), that is not regular, that separates clearly, the "selection of publications" (listed as last-in first-out) with (1) a full neutral synthesis for each major publication, (2) a quick snapshot of contents for other publications, (3) the results of new collecting trips (if any reported to editor), AND, within a paragraph titled "View from the chair", personal, but impartial and balanced comments raised from some of those selected publications IN VIEW OF THE TRANSLATION OF THEIR RESULTS INTO Killi-Data, and not as opinions or judgments on the quality of those research papers.

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