Cosmopolitan species, fact or fiction?

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Species reported as widespread

Many species have been reported as having extremely widespread distributions.
Examples include *Owenia fusiformis*, *Terebellides stroemii*, *Marphysa sanguinea, Loimia medusa.*
So covers a large number of families.
However suggest that while many polychaete genera are widespread, species (at least most) have restricted distributions, at least naturally.
Excluding those species which are transported around the world in ballast water, hull fouling or via aquaculture.

So how has this state of affairs arisen?

Typically these so called “cosmopolitan” species were described in the 19th century

Often original descriptions poor with few illustrations

Type material often not deposited or if deposited been lost or destroyed

In other cases European workers studying Australian fauna often reported them as European records
Complicated as often type species of genus

Keys to species

Often people use keys not appropriate to their , geographical region

People often use Day's Polychaetes of South Africa, even if working in Australia, South Pacific, China for eg

Another widely used is Fauvel's Fauna de France, even outside of Europe

Both of these monographs are well illustrated, people key out species without checking descriptions

One can only key out known species!!! Not undescribed ones

Case study

***Terebellides stroemii* Sars 1835, has characteristic lobed branchiae**

So people sorting benthic samples see this kind of branchiae and immediately record them as *T. stroemii*

Failing to actually look at the sort of chars which are being used to separate species of this genus Nos of lobes, anterior neurochaetae, shape, orientation, size and lateral collars

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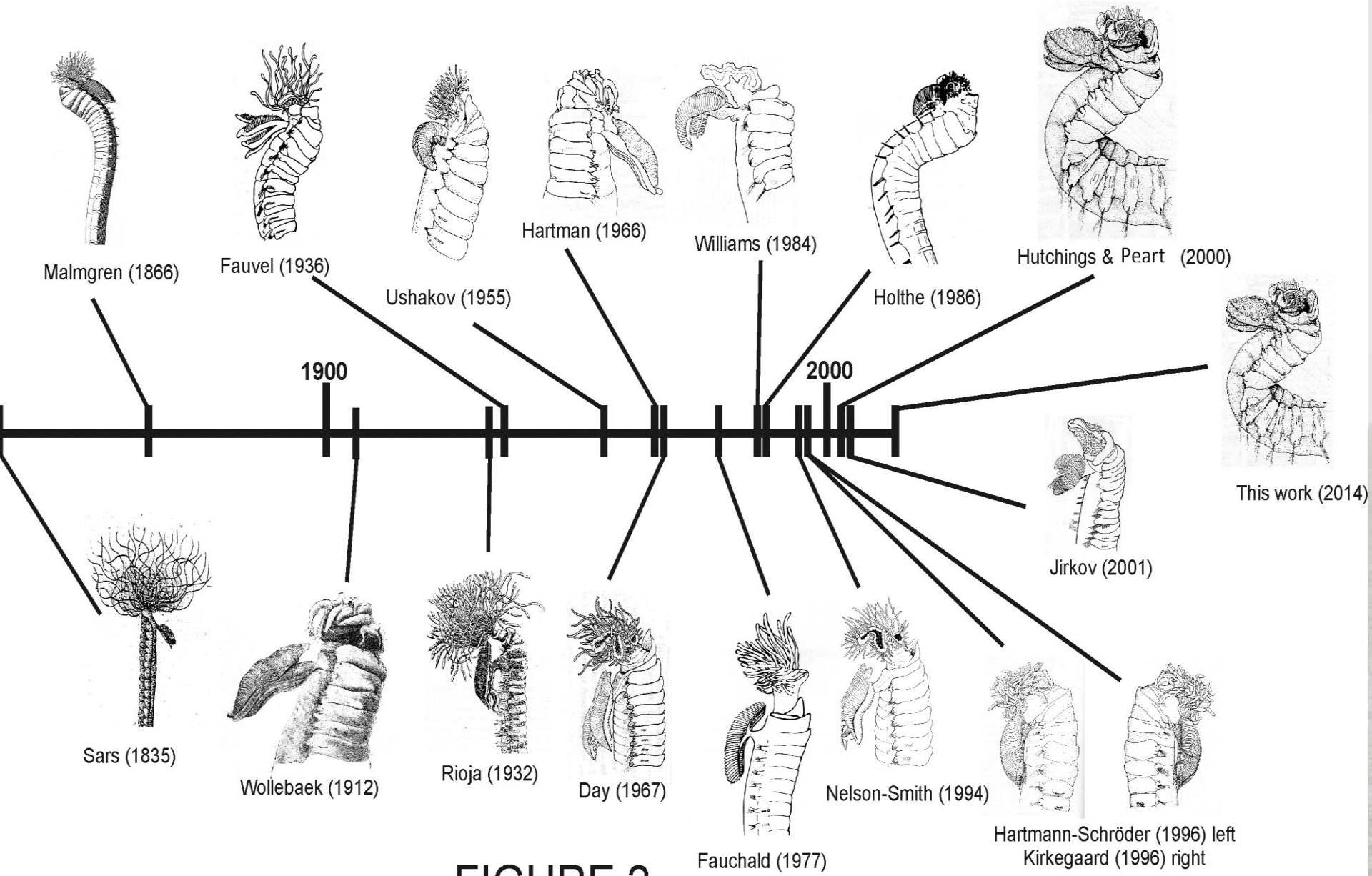

FIGURE 2

Various illustrations of supposedly *Terebellides stroemii* from around the world

Owenia fusiformis Delle Chiaje, 1841

Owenia fusiformis originally described from Naples, **has a very characteristic tube.**

One oftens finds samples of such tubes labelled as *O. fusiformis*, and the animals not even removed from the tube!

Suspect all species of *Owenia* have these characteristic tubes

In reality *Owenia* consists of numerous species which are increasingly being described, using a range of characters which have been revealed using SEM.

Pista cristata (Müller, 1776)

***Pista cristata* been described from many locations from its original type locality in Norway, represents type species of genus**

However at least Southern Ocean records are not *Pista cristata*. It is likely that this species is actually restricted to Norwegian waters.

Differs in the arrangement of the branches in the plume shaped branchiae, structure of uncini as well as lateral lobes.

So again this represents an undescribed species

Pista cristata saga continued

Even more complicated than *Owenia fusiformis* as the type species of *Pista* appears to have only 1 pair of plume-shaped branchiae and no long-handled anterior uncini

Means an entire revision of *Pista* is needed plus of other genera with anterior long-handled anterior uncini

So what is needed to resolve these messes?

1. Try to locate type material if not available
2. Find material from type locality
3. Designate a neotype and fully describe the species and list important diagnostic characters
4. Only then can one determine the true identity of the other material previously identified as these so called “cosmopolitan “ species
5. Voucher material collected during ecological surveys needs to be deposited in museums
6. Such information needs to be disseminated via electronic keys –and field guides

Recent workshop in Caen

We must realise that even in areas where fauna previously thought to be well known
Many species have been misidentified
Would contend that polychaete diversity is often seriously underestimated even in shallow waters
Certainly true in deeper waters
Museum collections really important and increasingly as become databased become more accessible
Just need to employ more taxonomists

So why so important to correctly identify species?

For example *Marphysa sanguinea* described from Australia, forms the basis of an important bait worm industry in Moreton Bay, Queensland.

M. sanguinea from type locality in Devon lives in crevices breeds when water temperatures are falling at 15˚C in late summer, in Moreton Bay lives in seagrass beds and breeds in early summer water temperatures of 24˚C and air temperatures exceed 30˚C.

Not *M. sanguinea* but *M. mullawa* which we described a few years ago.

So really important to know what species dealing with in order to develop management plans

Not all species in a genus do the same thing!!!