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PLAGIARISM IN PALAEONTOLOGY. A NEW THREAT WITHIN THE SCIENTIFIC COMMUNITY

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When the editor of a journal, and then the reviewers, receive a manuscript, they always rely on the honesty of the author presenting the data. That is, it is always assumed that the data are correct. Somebody may disagree with the interpretations; this is part of the scientific debate and how science progresses. However, the data supporting the interpretations are assumed to be trustworthy. This is part of the moral/ethical responsibility of researchers in Science. Unfortunately, the frontier of this scientific ethical behaviour is sometimes transgressed. There are several well-known frauds in the history of the Palaeontology, for instance the Piltdown skull (Gould, 1994), maybe one of the most notorious cases of outright deceit. After reading a book on the history of the Palaeontology, it can be easily concluded that this dishonest practice is part of the history that does not correspond to the present-day scientific behaviour. Surprisingly, alarming cases of corrupt behaviour among palaeontologists have been recently highlithted, such as the peripatetic fossils from the Himalaya Mountains (Talent, 1989).

Here, a new case of scientific fraud, involving plagiarism of images and duplications of photos in different papers supposedly dealing with sediments and fossils from different areas and of different ages is reported. The person involved in this fraud is Mostafa M. Imam, from the Scientific Department of the College of Education for Girls in Saudi Arabia.

In the last two decades, Imam has published several papers, both by himself and in collaboration with other authors, on microfacies, foraminifers and coralline red algae from Eocene, Miocene and Pliocene sediments of several areas of Egypt and Libya. During these years, this author has repeatedly been plagiarising pictures of diverse organisms previously published by other authors. Additionally, Imam has been using the same pictures in the different papers that he has published concerning different areas and rocks of different ages.

The fraud came up looking at the pictures shown in a manuscript that Imam submitted for publication in *Revista Española de Micropaleontología*. The manuscript deals with the lower Miocene coralline red algae from Egypt and includes four plates, with eight pictures each. The alert started with the Figure 6 of the first plate. Imam identified the fossil illustrated in this figure as *Lithophyllum* spp. of the lower Miocene deposits of the Sadat Member (Gharra Formation) from Gabal Gharra (Cairo-Suez road, Egypt). Nevertheless, the image is actually the same photograph of a coralline alga, *Lithophyllum incrustans* Philippi, from the upper Pliocene deposits of Cabo Roche (Conil, SW Spain) (Aguirre *et al.,* 1993). The same specimen was later used in a review paper of the coralline species belonging to the subfamily Lithophylloideae from the Neogene basins of southern Spain (Braga and Aguirre, 1995).

But this is not the only image plagiarised in this manuscript that Imam tried to publish in *Revista Española de Micropaleontología*. There are at least 14 pictures in total copied from other papers published in different journals by different authors. Furthermore, Figures 2 and 5 (Plate 3) of this manuscript are exactly the same images. Nevertheless, Imam refers to them as different samples with different magnifications: the former is attributed to sample 103 (magnification x 80) and the latter is quoted as sample 100 (magnification x 60).

All these examples of plagiarism appear in one paper, which is not yet published (and fortunatelly may never be published). Thus, the next step is to go through the papers that Imam has already published to ascertain whether he used the same fraudulent practice in previous papers and, if so, for how long. Surprisingly, a quick look at the available papers reveals that Imam did the same in the past!! Below, some examples are provided.

1. Imam reported and illustrated the species *Archaeolithothamnium saipanense* Johnson in the middle Miocene (Langhian to Serravallian) sediments of the Hammam Farum Member (Belayin Formation) at Gebel Gushia

section, west-central Sinai (Egypt) [Fig. 3 (1)] (Imam, 1996). As the author explicitly states in the Introduction section of the paper, the mentioned section is located Lat. 29° 15'N and Long. 33° 10'E. No question about the source area of the material.

Later, Imam and Refaat (2000) quoted the same species [Fig. 7 (5)] in the Wadi Abura section (Lat. 22° 02'N, Long. 33° 34'E) and Gabal Hammam Sayidna Musa section (Lat. 28° 01'N, Long. 33° 34'E).

This species (as *Sporolithon saipanense)* is also cited in the lower Miocene (Burdigalian) deposits at Al Khums area of the Sirte Basin (NW Libya) (Fig. 1, Plate 3) (Imam, 2003). In this paper, Imam even proposed a total range biozone with this species, the *Sporolithon saipanense* Zone, that characterises the lower part of the Al Faidiyah Formation (Burdigalian in age) at Libya.

The reader soon discovers that this species of coralline alga is present in almost all the published papers by Imam. Nevertheless, the pictures shown in all these papers are exactly the same. Adding insult to injury, this picture actually belongs to a specimen first published by Johnson as *Archaeolithothamnium* sp. from the upper Eocene Matansa limestones of Saipan (Mariana Islands) (Fig. 10, Plate 37) (Johnson, 1957), latter published again in the seminal book on calcareous algae by Johnson (Fig. 1, Plate 2) (Johnson, 1961).

2. In the paper dealing with the material from NW Libya, Imam (2003) identified *Lithothamnion macrosporangicum* Mastrorilli and *Lithothamnion libanum* Johnson. Imam shows these two species, respectively, in Figures 2 and 7 (Plate 3). However, these photographs are duplicated from Figures 2 and 5 (Plate II) of Aguirre *et al*. (1996), both of them representing conceptacles of *Lithothamnion ramossisimum* (Reuss) Piller from the Leitha Limestone (Middle Miocene −Badenian−) of the Vienna Basin.

3. In the same paper by Imam (2003), the Figure 3 (Plate 3) represents *Sporolithon* sp. from lower Miocene sediments of NW Libya. Notwithstanding, this picture is the one figured by Johnson as *Archaeolithothamnium nummuliticum* (Gümbel) Rothpletz (Fig. 2, Plate 2) from Eocene of Ryûkyû-rettô (Johnson, 1964).

4. The coralline algae from Libya illustrated by Imam (2003) in Figures 6, 7 and 8 of Plate 4, as well as the Figure 5 of Plate 5 are, respectively, identified by this author as *Sporolithon cyrenaicum* Raineri, *Mesophyllum guamense* Johnson, *Mesophyllum sancti-dionysi* Lemoine, and another specimen of *S. cyrenaicum*. Nevertheless, this photos are directly reproduced from a paper by Martín *et al.* (1993) dealing with the middle Miocene rhodoliths of Marion Plateau (NE Australia).

5. Figure 9 (Plate 4) reproduced by Imam (2003), which appears as *Lithothamnion disarmonicum* Conti, is really the picture of the holotype of *Lithothamnium luxurum* described by Johnson and Stewart from the Eocene deposits of Meganos Platform (California) (Johnson and Stewart, 1953).

6. Figure 10 (Plate 4) of Imam (2003) is presented as *Lithophyllum simplex* Lemoine and supposedly comes from the Al Khums Formation (Qabilat Ash Shurfah section at NW Libya). However, this picture corresponds to the microphotograph of a specimen of *Aethesolithon* dredged from middle Miocene deposits from Queensland Plateau (NE Australia) and published by Martín and Braga (1993) (Fig. 1, Plate 2). In this case, the specimen shown by Imam is rotated 180° with respect to the original picture.

7. Imam (2003) showed the basal part of a thallus of *Lithophyllum bonyense* Johnson (Fig. 2, Plate 5) and a conceptacle of *Lithophyllum kuglieri* Johnson (Fig. 4, Plate 5) in the material from Libya. However, these two pictures actually correspond to two photos of *Lithophyllum* from the Miocene deposits of Fiji studied and illustrated by Johnson (1961) (Figs. 1 and 2, respectively, of Plate 10). The same picture of the conceptacle attributed to *L. kuglieri* by Imam (2003) and supposedly coming from the NW of Libya, has been also published as *L. kuglieri* by Imam and Refaat (2000) [Fig. 7 (6)], but in this case the studied material theoretically belongs to the lower Miocene deposits of the Sinai (Egypt).

8. Figure 6 (Plate 5) of Imam (2003) shows a thallus with two conceptacles identified by this author as *Lithophyllum duplex* Maslov from the NW of Libya. However, this picture is originally figured by Piller and Rasser (1996) and Rasser and Piller (1997) as a recent specimen of *Lithophyllum kotchyanum* Unger dredged from the NW margin of the Safaga Island (Safaga Bay, Red Sea, Egypt).

9. Figure 7 (Plate 5) of the same paper (Imam, 2003) represents supperimposed thalli of *Lithoporella melobesioides* (Foslie) Foslie encrusting serpulid worm-tubes. However, the original source of this picture is Figure 6 of Aguirre *et al*. (1993), which shows laminar thalli of *Titanoderma* from the upper Pliocene deposits of Cabo Roche (Conil, SW Spain).

10. Martín *et al*. (1997) described and illustrated *Halimeda* plates from upper Miocene (Messinian) *Halimeda* mounds of the Sorbas Basin (Almería, SE Spain). One of the picture that these authors figured (Fig. 7a) is exactly reproduced by Imam (2003) (Fig. 8, Plate 5) as *Halimeda* segments from the middle Miocene Al Khums Formation (NW Libya).

11. Imam (2003) illustrated *Spongites albanense* Johnson from the middle Miocene Ras Al Shaqqah section of NW Libya. This picture is copied from Figure 3 (Plate 26) figured by Johnson (1963) as *Archaeolithothamnium penicillum* Pfender.

Apart from these plagiarisms, Imam also duplicated images of coralline algae in different papers. Thus, he illustrated *Lithothamnion operculatum* Conti [Fig. 5 (Plate 3)] and *Mesophyllum lemoineae* Souaya [Fig. 8 (Plate 3)] from Libya (Imam, 2003). However, the same pictures are respectively cited by Imam and Refaat (2000) as *Mesophyllum vaughanii* Howe [Fig. 6 (8)] and *Lithophyllum densum* Lemoine [Fig. 6 (1)] in the material collected from southern Sinai (Egypt).

Figure 4 (Plate 4) of Imam (2003) and Figure 6 (6) of Imam and Refaat (2000) also represent duplicate pictures of supposedly different coralline algal species. The former corresponds to *Mesophyllum vaughani* (Howe) Lemoine from NW Libya, while the latter is quoted as *M. laffittei* Lemoine from the Sinai (Egypt). In this case, one picture is rotated 90° with respect to the other.

These are only some examples of the ingenuity of Imam. This behaviour is not limited to plagiarisms or duplications of pictures of coralline algae. Scrutiny of certain images published by Imam demonstrates that he also lifted pictures of microfacies and foraminifers. Regarding microfacies, Youssef *et al*. (1988) showed fragments of subangular cherts of a microcrystalline quartz (Fig. 6b) belonging to the phosphatic sandy biosparite facies described by these authors in the middle Miocene deposits of the Gebel Sarbut El Gamal section (west-central Sinai, Egypt). Surprisingly, the same picture, although turned upside-down, is also shown as representative microfacies of the Ras Al Shaqqah section, Al Khums Formation from NW Libya (Imam, 2003).

Figure 6 (Plate 6) and Figures 1 and 8 (Plate 7) of the microfacies illustrated by Imam (2003) from NW Libya are also repited by Youssef *et al*. (1988) as Figures 12A, 9B and 13C, respectively, in the paper dealing with middle Miocene deposits of the Sinai.

Additionally to the plagiarism and duplication of pictures of coralline algae and microfacies, Imam has also plagiarised pictures of dasyclads in other papers that he has already published, as confirmed by a study in progress carried out by other colleagues working on this group of green algae (Bruno Granier, Ioan Bucur, Baba Senowbary-Daryan, etc.).

Clearly, Imam has made an industry of copying other author's work in his papers; it seems that no of the images he has used in his papers are originals. This fraudulent practice has important implications far beyond the only interest of scientists working on or interested in corallines or in dasyclads. It also affects researchers working on the regional geology of NW Africa. Imam has established the timing of sediments cropping-out in different places of NW Africa, and interpreted the palaeoenvironmental settings based on microfacies and calcareous algal assemblages. Yet, these results and conclusions are based on false and plagiarised data.

Beyond the only interest to Earth scientists, Imam's unauthorized borrowing once again brings up the everlasting and recurrent issue of the scientific ethics. Nowadays, scientific literature is overwhelmed by papers, making it difficult task to discover fraudulent practices (untruthful data, plagiarism, duplications, and so on). Therefore, discovering these unusual practices and unethical behaviour of researchers is an issue that concerns to everybody within Science; the editors of journals, the reviewers involved in the revision and correction of manuscripts, and, of course, the scientists when reading papers. We all together are forced to struggle among fraudulent and dishonest practices in Science.

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