Micropaleontological education in Indonesia

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In May 2012, Bailey and Jones published an article titled "**Micropalaeontology Under Threat!"** in Geoscientist Online Special, which attracted a number of readers' attention. This topic was discussed further in the Sedimentology and Paleontology Linked-in group. The article describes trends in the United Kingdom, but these are similar in many other countries. It observed how since the 1980's the employment opportunities for micropaleontologists decreased as a result of downsizing by oil companies, how training opportunities decreased due to reduction in the number of universities teaching micropaleontology courses, and how retirements of an aging population of biostratigraphers may soon lead to a shortage in experienced biostratigraphers.

To understand the situation in Indonesia, the topic was launched in IAGI-net. A simple survey was run on Facebook to involve students. This article summarizes the discussion and survey to provide a general understanding and quick overview on how micropaleontological education is conducted in Indonesia.

In general micropaleontological classes were given in all geological departments in Indonesia. This subject is still considered as a fundamental topic in geology. As the fossils are basically biological objects, some of the biological departments (e.g. University of Gajah Mada and University of Sudirman) provide micropaleontological classes as possible options. This subject is considered as a foundation in geological programs. In some universities, micropaleontology is also included as part of field mapping programs.

The opportunity to become a professional biostratigrapher is unfortunately restricted. Until the 1970-1980's several oil companies in Indonesia, like Pertamina, Shell, Caltex, Stanvac and Unocal, had their own micropaleontology departments. Today these have all closed and this specialized skill is kept mainly in consulting companies like CoreLab and Geoservices and government institutions such as Lemigas[1], GRDC[2] and LIPI. A small number of biostratigraphers made a career as independent consultants. These institutions employ biostratigraphers and sometimes provide their staff with scholarships to pursue PhD and MSc degrees overseas in micropaleontological subjects. These experts provide biostratigraphical analysis for petroleum companies. These companies, however, often do not have enough staff with a strong understanding of biostratigraphical concepts to understand and integrate the analysis results delivered by the consultants or institutes. This may result in miss-applications or miss-integration of micropaleontological data in the industry (personal communication with B. Y. Chandra in IAGI-net).

Nowadays Akmaluddin (a micropaleontology lecturer from UGM Yogyakarta) and Irwansyah (micropaleontologist from Lemigas), also observe a decrease of interest on micropaleontology in general. According to them recently there have been fewer students who are taking or are interested in micropaleontology as their final year undergraduate thesis. Many students prefer to evaluate subsurface data (e.g. seismic and log data) from petroleum companies for their final project. Although they usually still include micropaleontological discussions in their thesis, they are relatively shallow.

Wildanto P. Nusantara, an Indonesian palynologist who is based in Perth, Ausralia, agreed with Bailey and Jones (2012) concern. He saw a big room of opportunities for micropaleontological research in Indonesia, but the interest and support are lacking. Currently, Indonesia still does not have a dinoflagellate expert and getting a sponsorship for pursuing this study is very difficult. It seems that a database revolving around dinoflagellates for Indonesia is minimal and Indonesia is far behind in dinoflagellates studies compared to Australia. Irwansyah also mentioned that Indonesia still needs micropaleontologists who are familiar with pre-Tertiary formations. Unfortunately, with limited sponsorships, Indonesia will short of micropaleontological experts.

A simple questionnaire on micropaleontological education in Indonesia was returned with a number of students. The questionnaire is aimed to gather some information regarding the facilities in Indonesian universities. The result is shown in Table 1, which includes the number of binocular microscopes for micropaleontological studies and number of lecturers.

Compared to 1961 (Katili, 1961) it is interesting to note that ITB, the first geological department in Indonesia, still has the same number of microscopes. This is probably due to the size of the laboratory. The qualities of the microscopes, however, have improved significantly. Katili (1961) reported 15 microscopes for micropaleontological education in all of Indonesia. These days, there are about 146

***Table. 1**. Number of binocular microscopes in micropaleontological laboratory in Indonesian universities and their lecturers.*

University / City	Binocular microscope (good condition)	Lecturers
Pakuan / Bogor	6 (4)	Teti Sahrulyati
ITM[3]) / Medan	15 (5)	Rasyid Mustafa, Purba
Univ. Diponegoro / Semarang	10 (3)	Hadi Nugroho
ITB[4]) / Bandung	15	Tjipto Rahardjo, Khoiril Anwar, Rubiyanto Kapid
Univ. Trisakti / Jakarta	21 (?)	Dewi Syavitri, Ulam Nababan
Univ. Hasanuddin / Makassar	10 (?)	Fauzi Arifin, Ratna Husain, Meutia Farida
Univ. Padjajaran / Bandung	37 (29)	Lia Jurnaliah, Winatris, Lili Fauzielly and Vijaya
Univ. Pembangunan Negara/ Yogyakarta	15	Premonowati, Mahap Maha, Ign. Hedrobusono, Siti Umiyatun Ch
Univ. Gajah Mada / Yogyakarta	23	Moch. Indra Novian dan Pak Akmaluddin
Univ. Indonesia / Depok	0	None – geophysics program only
Univ. Brawijaya / Malang	0	None – geophysics program only



***Figure 1**. An example of a binocular microscope in the geological department of UPN Veteran, Yogyakarta (source: http://www.geoupn.org/tinymcpuk/gambar/Image/2.jpg)*

microscopes available for micropaleontological studies. Although there more microscopes, probably they are still not enough for the students nowadays. Let's us take ITB as an example. The 15 microscopes reported by Katili in 1961 were used by less than 15 students (about 1:1 ratio of student and microscope) and the same number of microscopes are now used by almost 50 students (3:1 ratio). The ratio for some other universities may worst compare to ITB.

Based on the correspondences with professional micropaleontologists, it is understood that nowadays biostratigraphical studies, which deal mainly with primary rock, compete heavily with studies with secondary data such as seismic and logs. Many students believe that a thesis based on seismic and logs will help them to find jobs in the petroleum companies. If this trend will continue, and sponsorships for further studies are difficult to get, we may conclude that Indonesian micropaleontology is also under threat. Since microfossils still provide the main age and paleoenvironmental controls in sedimentary basins (van Gorsel, et al., 2014) , any decrease in volume and quality of biostratigraphic work in Indonesia would have a negative effect on the quality of correlations, geological interpretations, etc. (Lunt, P, 2013). Hopefully this article can raise awareness and give the reader food for thought. In the near future, we may be able to find a solution and encourage more biostratigraphical studies.

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Notes

[1]) Lemigas: Lembaga Minyak dan Gas = Indonesian Research and Development for Oil and Gas

[2]) GRDC: Geological Research and Development Centre (now Center for Geological Survey, Indonesia), Bandung

[3]) ITM: Instute of Technology, Medan

[4]) ITB: Institute of Technology, Bandung