Baseline metabolism is the minimum metabolic rate, which a fish requires to maintain the physiological systems needed for survival. By definition, this minimum rate excludes any kind of internal or external work, even digestion, and all movements, except for gill ventilation. The common method to estimate baseline metabolism is to measure or calculate a Standard Oxygen Consumption (SOC).

A number of factors affect the oxygen demand of fish, aside from the influence of the apparatus and methodology applied and the fish size, the foremost factors are: temperature (and availability of oxygen), and the mode of life of the fish, particularly its spontaneous activity. In earlier studies different approaches were tried, while the methods were further developed and improved. However, due to the fact that many factors were neglected, those approaches were tried, while the methods were further developed and improved. Most papers, however, did not focus on the influence of temperature, whereas other factors were neglected.

In recent publications, attention has been paid to the baseline metabolism of tropical fish. In the initial years of the 21st century, the interest in the study of tropical fish increased. In particular, in the field of respiratory physiology, fish metabolism has received much attention. The emergence of the field of respiratory physiology was due to the development of new methods, such as the use of respirometers, which allowed for the measurement of baseline metabolism in fish. These methods were further developed and improved, leading to the establishment of new standards and methods for the measurement of baseline metabolism.

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Baseline respiration and spontaneous activity were recorded in the course of the experiments for 6 tropical scorpions, belonging to 2 different genera: Scorpaenopsis oxycephalus, S. diabolus (false stonefish), Parascorpaena sp. and P. aurita. The experiments were conducted in a modified intermittent-flow respirometer at 24°C, at ambient light regime (12:12 darkness:light) and salinity (35 ‰). During March 1997 the lab of the Bung Hatta University, Padang/Western Sumatra. Single fish were kept in circular, flat bottom respiration chambers, large enough to allow spontaneous movements. Water was continuously sub-sampled, the oxygen content and temperature was automatically determined (polarographic oxygen probe), and the water recirculated to the chamber. When the O2 saturation dropped below 89%, the water was automatically exchanged with oxygenated seawater from a separate tank, controlled by a computer, which also calculated the oxygen consumption.

Conclusions

- Activity patterns of fish investigated are similar to that of tropical and boreal scorpions. The temperature adaptation, spontaneous activity of a tropical fish can very well be as little as that of a polar fish.
- SOC lowest ever recorded for tropical marine teleosts.
- Compared to scorpions of other climates, the thermal sensitivity of tropical scorpions might be reduced.

The investigated scorpions showed a surprisingly wide range of activity. This reflects mainly individual differences and is hardly attributable to the different species the specimens belong to. It is commonly clear that spontaneous activity will be measured for every single fish. Generally, it became obvious that the determination of an SOC without simultaneous and permanent recording of activity would only be possible for extremely sluggish fish. Compared to polar fishes measured earlier with the same methods, tropical scorpions show activity patterns similar to those of the arctic/boreal sculpins (Cottus gobio, Gymnocephalus spp.). The variability of the whole set-up of the respirometer, including baseline metabolism raises by a factor of 1.65 when using only the SOC and thus the food requirements for fuelling baseline metabolism might be relevant.

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