

That species diversity is generally highest in the tropics and falls off towards either pole is a familiar, if not legendary, pattern in ecology. The pattern is well documented for a great number of groups (e.g. ants, Kusnezov 1957; marine bivalves, Stehli et al. 1967; New World birds, Dobzhansky 1950; United States lizards, Pianka 1983). Although many explanations for this pattern have been advanced, all have met criticism and none has been generally accepted as adequate. Explanations for high tropical diversity include high predation rates, habitat heterogeneity, high productivity, constant climate, evolutionary age, highly fractionated Pleistocene refugia, and many others (for brief review, see for instance Begon et al. 1986). In this note I propose another, much simpler explanation for the existence of more species in tropical regions; this is a physical mechanism, which does not require recourse to historical or complex ecological phenomena.

It is well known that the earth turns on its axis, completing one rotation in approximately 24 hours (Halliday and Resnick 1978); the essence of the centrifugal theory is that this results in species simply being flung to the equator. A simple analogy should make this clear. Imagine a very small ball to which a large number of objects are fastened by strings of uniform length. The objects, of course, are species; and the surface of the earth is imagined to lie at the ends of all the extended strings. The strings are analogous to the force of gravity. Now imagine that the ball is spun very rapidly; the result would clearly be an accumulation of the objects around the equatorial plane of the spinning system. Clearly, the latitudinal diversity gradient must result from the same process.

This mechanism also provides an explanation for Bergman's rule (that animals often increase in size towards the poles). Friction provides a force opposing the tendency of

animals to be flung to the equator, and the larger the animal, the greater the frictional force holding it in place. Furthermore, the larger the animal, the less likely it is to jump clear of the ground, eliminating frictional restraint completely (albeit briefly). Heavier animals do not slip to the equator as quickly.

The centrifugal theory of species diversity represents by far the simplest, most parsimonious explanation for tropical species richness of those suggested to date. The conventional use of parsimony to evaluate hypotheses would dictate acceptance of this mechanism in place of all other, overly elaborate constructs.

Literature Cited

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