Diversifying dynamics and their universality

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Ecological system is complex: a wide variety of interacting species consist each ecosystem. It is dynamically organized and maintained in evolutionary time scale. It is a challenge to clarify the essence why ecoevolution could achieve such complex self-organization. The answer will be simple and universal, because there are wide variety of ecosystems on the earth, and there should have been more variety in past. Such variety will not be realized without some simple universal mechanism. Models of ecoevolution dynamics are compared to reach the universal feature[1, 2], and it is found that a skew profile in life-time distribution function of species is the one. After a study of the simplest model, in an Ising sense, a random walk in a number-of-species space with so-called the Red-Queen Hypothesis is proposed and the skew profile turns out to be due to a stretched exponential function with exponent 1/2[3]. Such stretched exponential profile well-explains not only fossil data, but also some economical data.

References

