



NIE 포럼, 국립생태원
서천, 충청남도
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생태 모델 전망: 유전자에서 생태계까지

Perspectives in Ecological Modeling : from Genes to Ecosystems

전태수

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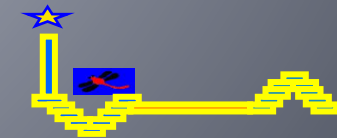
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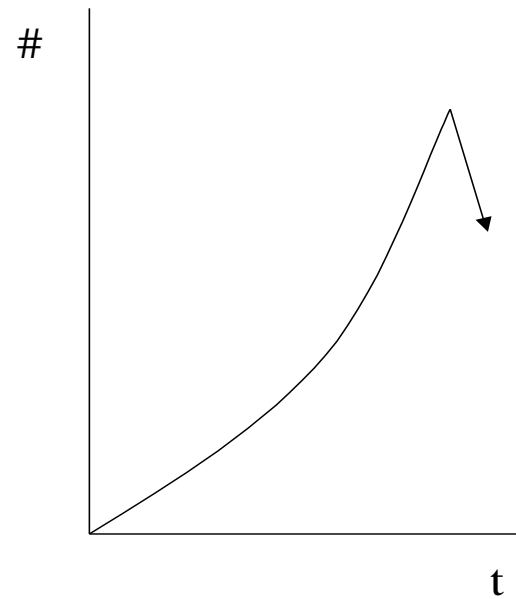


Disturbances and stressors across different levels in biological hierarchy (examples)

Unit	Issues (examples)
Ecosystem	Climate change, Biogeochemical cycle (e.g., CO ₂ , N, P)
Community	Biodiversity, Disclimax
Population	Epidemics, Pests, Food crisis
Individual	Tolerance to environment, Behavior instability
Cell and gene	LMO, Pesticide resistance, Chemical residue

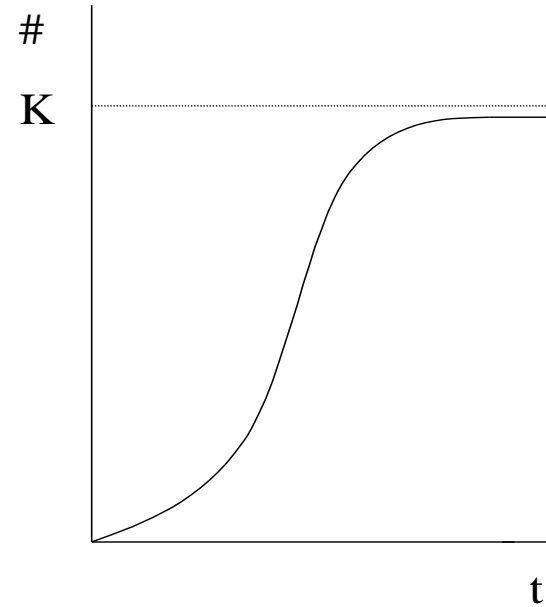
Necessity of Mathematical Concepts Regarding Population Growth

Two Types of Population Growth



$$N_t = N_0 e^{r_m t}$$

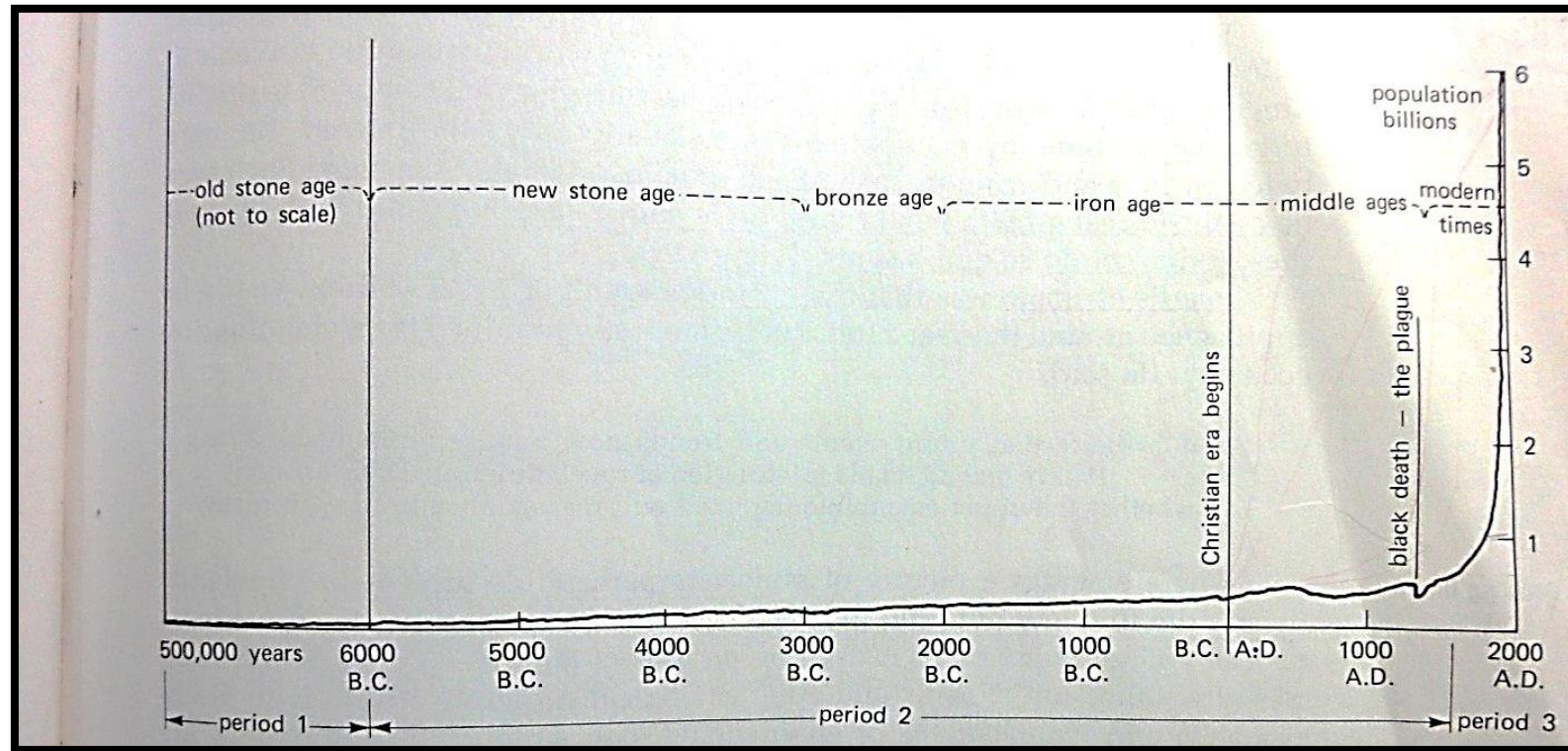
J-Type



$$N_t = K / (1 + e^{-a-rt})$$

S-Type

History of Human Population Growth

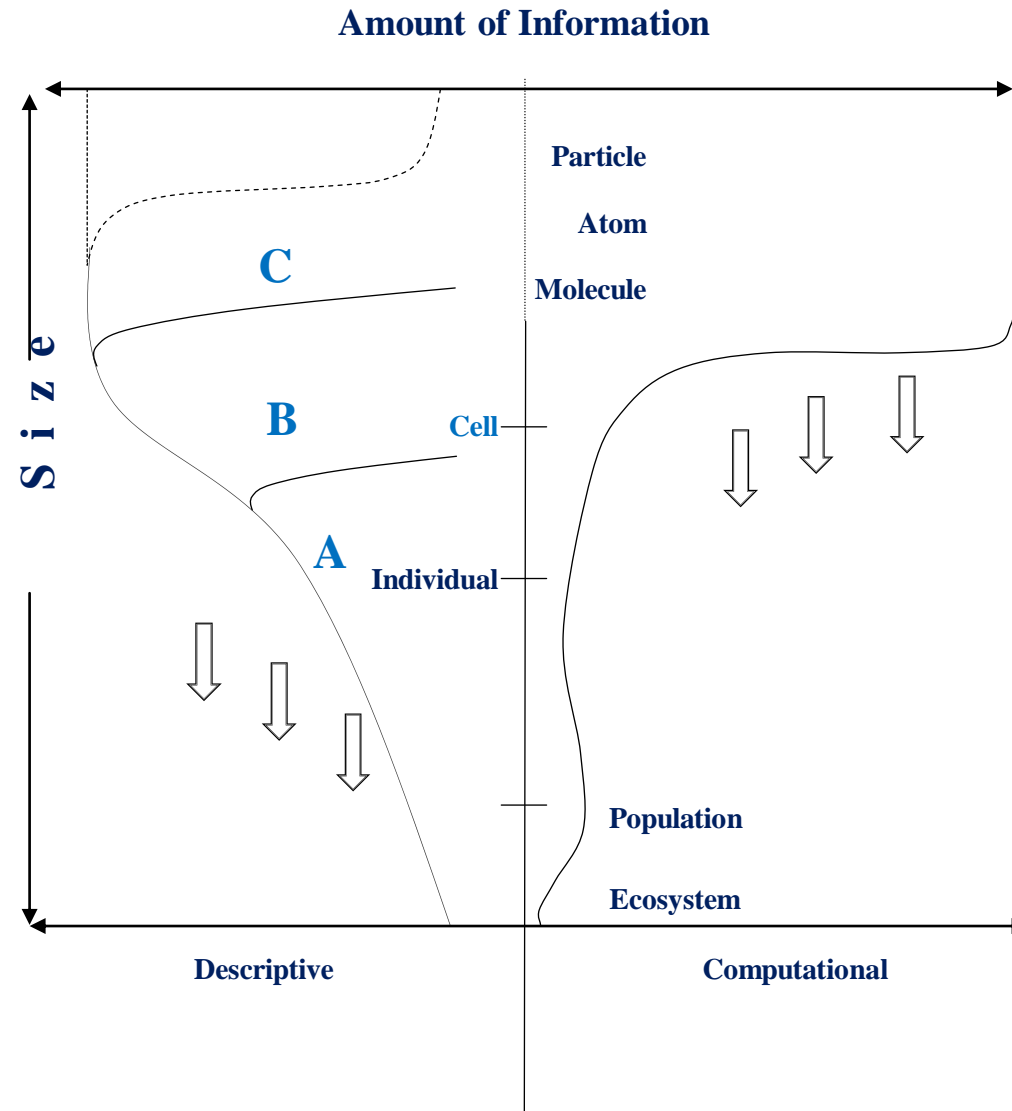


Human population growth. It has taken all of human existence in earth for the number of people to reach 3 billion. But in only 40 more years, the population will grow to 6 billion unless something intervenes. If the Old Stone Age were in scale, its base line would extend 35 feet to the left. Redrawn from "How Many People Have Ever Lived On Earth?" Population Bulletin, 1962, 18 (1). Reprinted with the permission of the Population Reference Bureau.

Maxwell, 1980

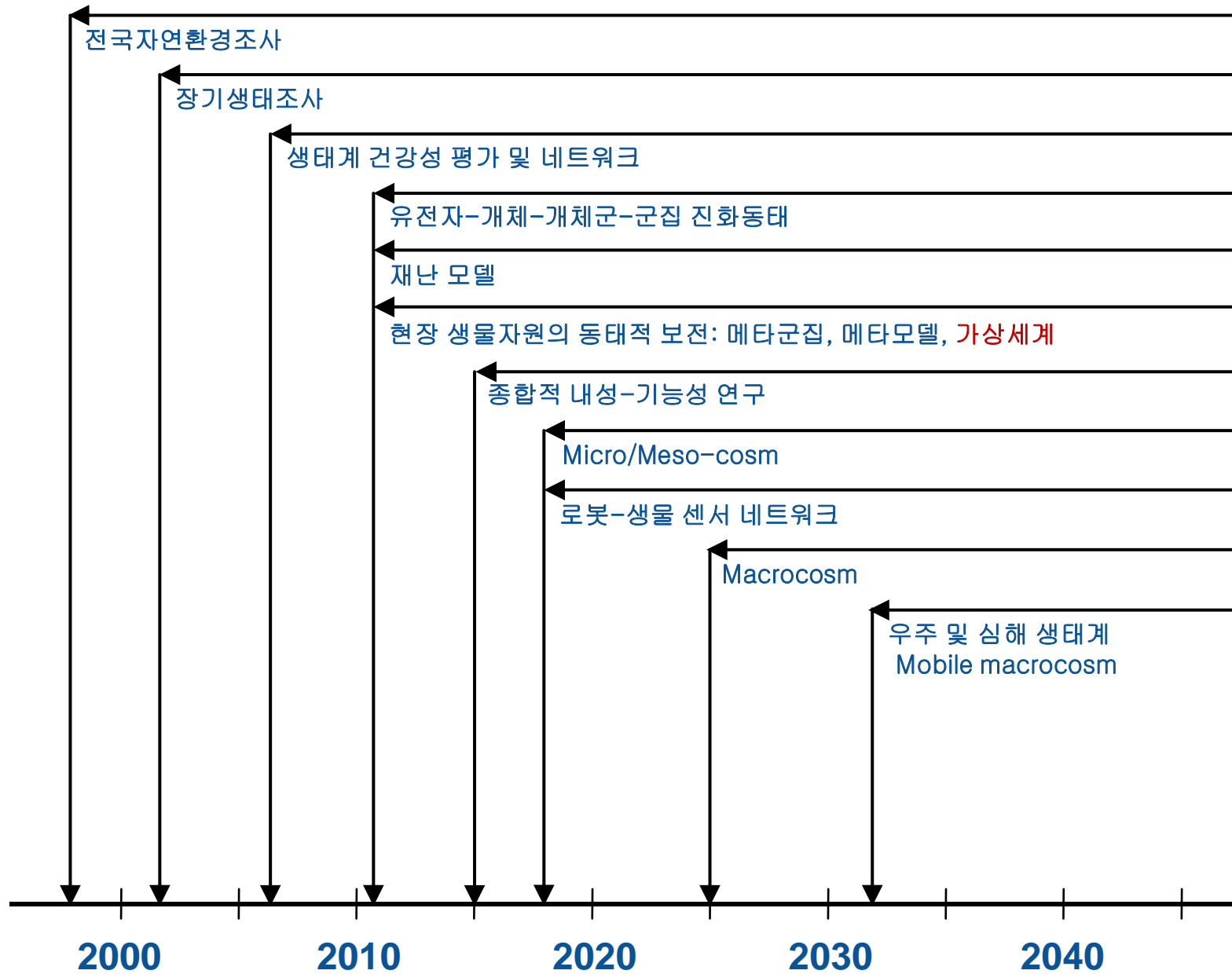
Information accumulated in descriptive and computational fields in biology across different scales:

(A: agriculture and medicine, B: cell science, and C: molecular biology)

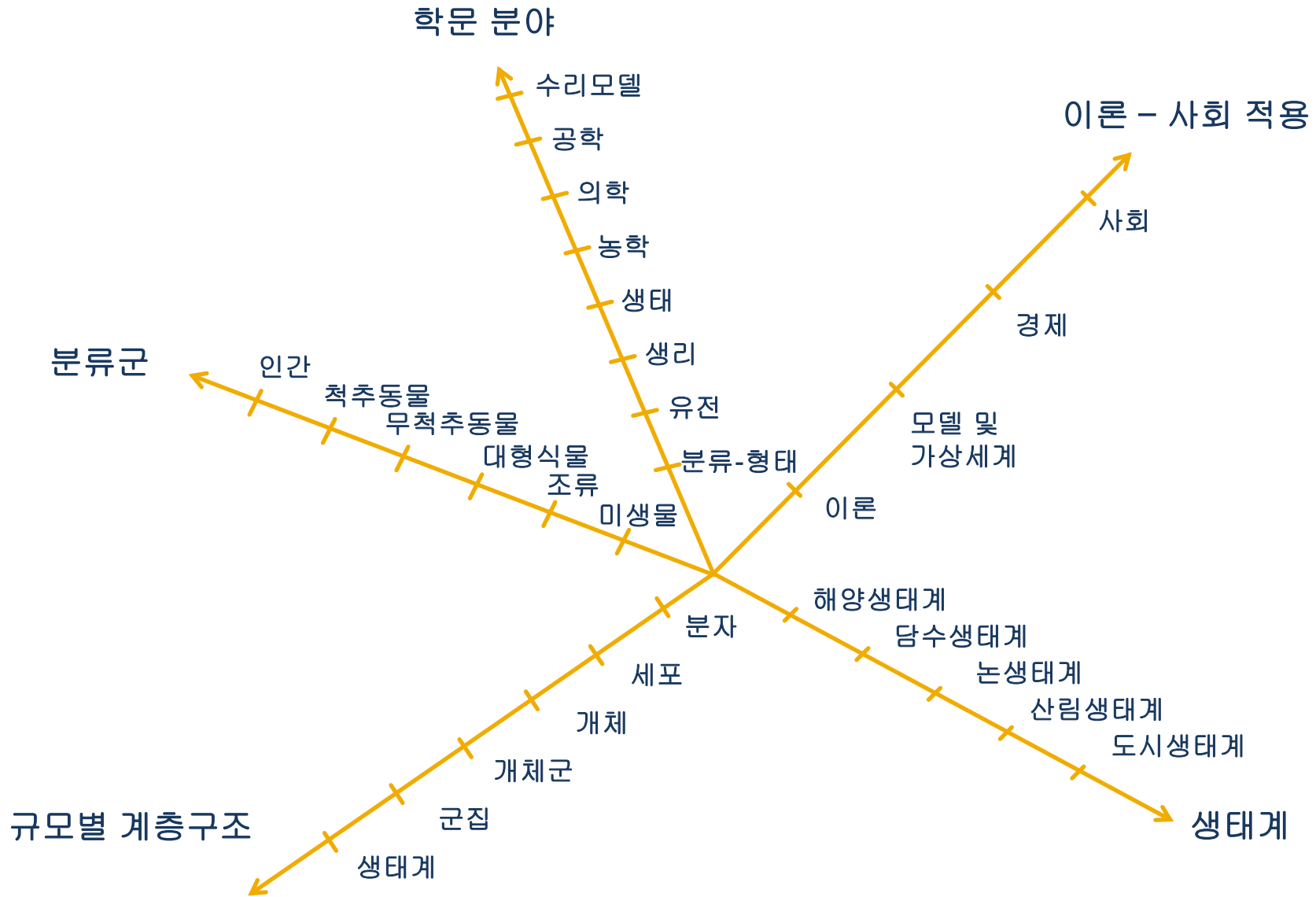


(15.1.30)

주요 생태과학 연구의 추정 시기



(15.1.30)



생태 연구를 위한 환학제 연구의 다축구조

(15.1.30)

Academic regimes in association with life system hierarchy: “bottom-up” and “outside-inside” approaches

