Human Ecology I 2006.May-June.

5/12 Introduction: Human Ecology and Environmental issues (Watanabe)

5/19 pm Special lectures: Dr. Dorling & Dr. Ballas

5/26 Methodologies if data collection in the field (Umezaki)

- 6/2 Chemicals and human health/survival (Watanabe)
- 6/9 <no class>

6/16 Long-term change of adapation (Umezaki)6/23 Nutrition-Ecological aspect (Watanabe)

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Today's outline.

What's human ecology?

Human ecology and environmental problems Human ecology in International Health

Explain ...

lodine deficiency **IPCC Global warming Epidemiological transition Bioconcentration and biomagnification** 2,3,7,8-TCDD sustainability **Ecological footprint** Carrying capacity net reproduction rate

Human Ecology as defined

Maruzen Encyclopedia(1995) [in Japanese]

A scientific discipline to investigate the adaptation of human to the environment. Related with anthropology, geography, sociology, demography. Its focus is on human survival at population level with comprehensive approach examining subsistence, food, demographic aspects. Since human species characterized by technology system, systems of concept and value, and social organization, cultural adaptation is a unique component of human ecology, which differentiate it from animal ecology. Human ecology is one of the most fundamental scientific tools to understand the human survival, and expected to provide basic information relevant to the solutions of environmental issues and demographic issues. first used by Park & Burgess (1924)

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population

Unit [of organisms] that inhabits in a specified region, sharing a gene pool, and survives for many generations.

Human population is characterized by its wide variation among the populations, compared to the populations of other species.

(Ohtsuka et al, 2002)

Human Ecology

Ecology of Human Species Ecology: study of the relationship between organism (species) and their environment.

>>> Basically, a biology – natural science – oriented discipline that aims at elucidating the mechanism(s) of survival/extinction of human populations.

>>> What are the important factors for survival/extinction of human population?

Human Ecology

>>> What are the important factors/activities for survival/extinction of human population?

Producing and consuming food producing, procuring, distributing food amount [of food items; nutrients] consumed utilization, ownership of land [re]Producing and raising offspring mating, producing, raising offspring who's the caretaker? population structure and its chronological changes how the offspring grows and their nutritional status like?

Human Ecology
>>> Difference from animal ecology?

• "cultural adaptation" what are the examples?

 Impact on the environment (the earth) why human are so powerful? Human Ecology and animal ecology >>> Difference from animal ecology?

 "cultural adaptation"
 ⇔ biological adaptation what are the examples?

 Impact on the environment (the earth) why human are so powerful? controling food controling energy

Human Ecology and animal ecology

>>> Difference from animal ecology?

- "cultural adaptation"
 biological adaptation what are the examples? Temperature altitude hazardous chemicals
- Impact on the environment (the earth)
 why human are so powerful?
 controling food
 controling energy
 impact = contaminate,
 change the environment to which the organism adapt.

Adaptation

(Suzuki, 1990) Process in which organism exert an adjustment which would be beneficial for the group that the organism belongs in response to the environment.

 Usually, the adjustment would be initiated when the organism is challenged by environmental stress, resulting either in a change of biological characteristics

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 = biological adaptation or

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- 4 types of adaptation in living organisms
 - 1. Phylogenetic (changes in genotypes by natural selection beyond a generation) Sickle-cell anomia and malaria tolerance

Sickle-cell anemia and malaria tolerance

- 2. Physiological modification (changes in phenotyces, within a life-span of an individual) Altitude, cold, plasticity in growth
- 3. Learning (adaptive behavior, achieved in a life-span)
- 4. Cultural modification (learning and culturally transmitted information)

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 - 1 vs 2-4:

1-2 sv 3-4;

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1 vs 2-4:

no change in genotype = responding to different ecological settings

1-2 sv 3-4;
behavioral change involving CNS function; also important in many animal species
1-3 vs 4:
reported in non-human primates, but distinctive in human

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Whether a trait is adaptive or not can be judged by the effect of that trait under given condition. Adaptation is one measure to maintain survival when a change occurs.

PON1 catalysys

pest₁

C]

ldes

hydrolysis=detoxification



PON1 polymorphism Which genotype is benaficial?





Fig. 2 Population distribution plots of: a, chlorpyrifos-oxonase vs. paraoxonase; b, arylesterase vs. paraoxonase; c, diazoxonase vs. paraoxonase (n = 92, a–c); d, somanase vs. paraoxonase (n = 75); and e, sarinase vs. paraoxonase (n = 78). $\bigcirc = QQ$ individuals (Gln_{192} homozygotes), $\blacksquare = QR$ individuals (heterozygotes), and $\triangle = RR$ individuals (Arg_{192} homozygotes). Genotype assignments were made from (c).

..... production and/or consumption entails ?

..... production and/or consumption entails ? Use of energy, resource generating waste releasing hazardous chemicals Human ecology and environmental issues (past) Capacity of environment >> human activity

consumption, waste ⇔ production, reproduction

(present) environment ~ human activity (scale, chemicals)

consumption, waist \Leftrightarrow production, reproduction

Environmental issues from human ecological point of view

- Production, consumption, resource use, waste generation
 - = as material flow
- Producing, consuming, using resource, generating waste
 - = as human behavior (activity)
 - = as a controllable or modifiable target
- Goal of control/modification ? sustainability viewpoint of locality

Mission of human ecology

- Production, reproduction as basic component of survival of population
 - = population biology
- using resource , generating waste as closely associated with production, reproduction
 - = environmental health

Environmental health in human ecology some considerations

• Whose health/survival should be promoted? (Whose viewpoint should be assumed?)

Environmental health in human ecology some considerations

Whose health/survival should be promoted? (Whose viewpoint should be assumed?)

- human or ecosystem
- present (contemporary) or future generation
- indigenous vs intruder

Issues to be considered

- Population increase \neq adaptation
 - ex) decreasing number of children

where's the population ?

Key concepts for adaptation in human ecology

- recognition and utilization/exploitation of environment
- changing and modifying environment also, the environment is changing (modernization, development, chemicals)
- human activity
- population (demography) and its structure
- health status, nutrition

