

## Relationships between carbon cycling and food web structure using carbon-14 natural abundance

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Carbon-14 is a naturally occurring, cosmogenic isotope that is normally used for carbon dating (half-life = 5730 years). Carbon dating is based on the fact that natural carbon-14 is produced at an approximately constant rate in the upper atmosphere by cosmic ray bombardment. However, during atmospheric nuclear weapon testing in the 1950s and early 1960s, large amounts of <sup>14</sup>CO<sub>2</sub> were produced in the atmosphere and it is called bomb carbon-14. Since the end of atmospheric testing, carbon-14 concentrations from nuclear tests in the atmosphere have declined. This trend has been used for studying turnover of carbon mainly by soil organic matter (SOM) dynamics. Studies of SOM dynamics in soils and soil respiration using carbon-14 concentrations were reviewed in Trumbore (2000) and Trumbore (2006). I, together with collaborating researchers, have utilized carbon-14 natural abundances for studying the use of carbon compounds in soil-feeding animals. The carbon-14 signature of an animal indicates the diet age, which is defined as the time elapsed since the carbon in its diet was fixed from atmospheric CO<sub>2</sub> by primary producers (Tayasu et al. 2002; Hyodo et al. 2006, 2008). This finding further indicates a potential utility of carbon-14 signature for studying relationships between carbon cycling and food web structure (Tayasu and Hyodo 2010). Ishikawa et al. (in press) measured carbon-14 signature of aquatic insects and suggested a utility of carbon-14 mapping in stream ecology. I propose the C and N isotope ratios and carbon-14 mapping for studying relationships between carbon cycling and food web structure in ecosystems.

### References

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