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LEAD TO VARIOUS DYNAMICS OF WEED COMMUNITIES

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Integrated Weed Management (IWM) systems are designed to

- ✗ to manage weed species,
- ✗ to reduce the reliance on herbicides,
- ✗ to maintain economically sustainable crop production.

But on a long term assessment ...

What are the effects of these systems on weed communities dynamic?

Cropping system experiment (Dijon, France)

From 2000 to 2012, four IWM systems (S2, S3, S4, S5) have been compared to a reference system (S1).

System	Objective	Average Herbicide TFI	Weeding techniques
S1 Reference		2.1	Ploughing, Herbicide
S2 No-till		1.4	Herbicide, Summer cover crops
S3 No mechanical weeding		1.0	Ploughing, Pre-sowing soil tillage, Herbicide with reduced doses
S4 Mixed chemical and non-chemical weeding		0.7	All techniques
S5 Excluding herbicides		0	All techniques except herbicides

The weed flora was surveyed several times each year, with 32 0.36 m² quadrats where the weed species were listed and their abundance precisely counted. Analyses use the maximum of abundance of each weed species during the year.

Richness and density of weed community

- ✓ Observed species richness (87 weed species; 824% of the extrapolated Chao' species richness) and densities (range: 0 to 310 individuals m⁻²) largely varied according to cropping systems and through the years.
- ✓ IWM systems showed systematically higher species richness (Figure 1) and abundance (Figure 2) than S1 system.

Species accumulation curves

- ✓ The accumulated species richness curves rapidly increases for the IWM systems (S2-S5)
- ✓ and leads to higher γ species richness (twice more species than in the reference system S1) (Figure 3).
- ✓ But, all systems show the same rate of species accumulation relative to their γ species richness (Figure 4).

Figure 1: Observed weed species richness on the four IWM systems (S2-S5); S1 as reference

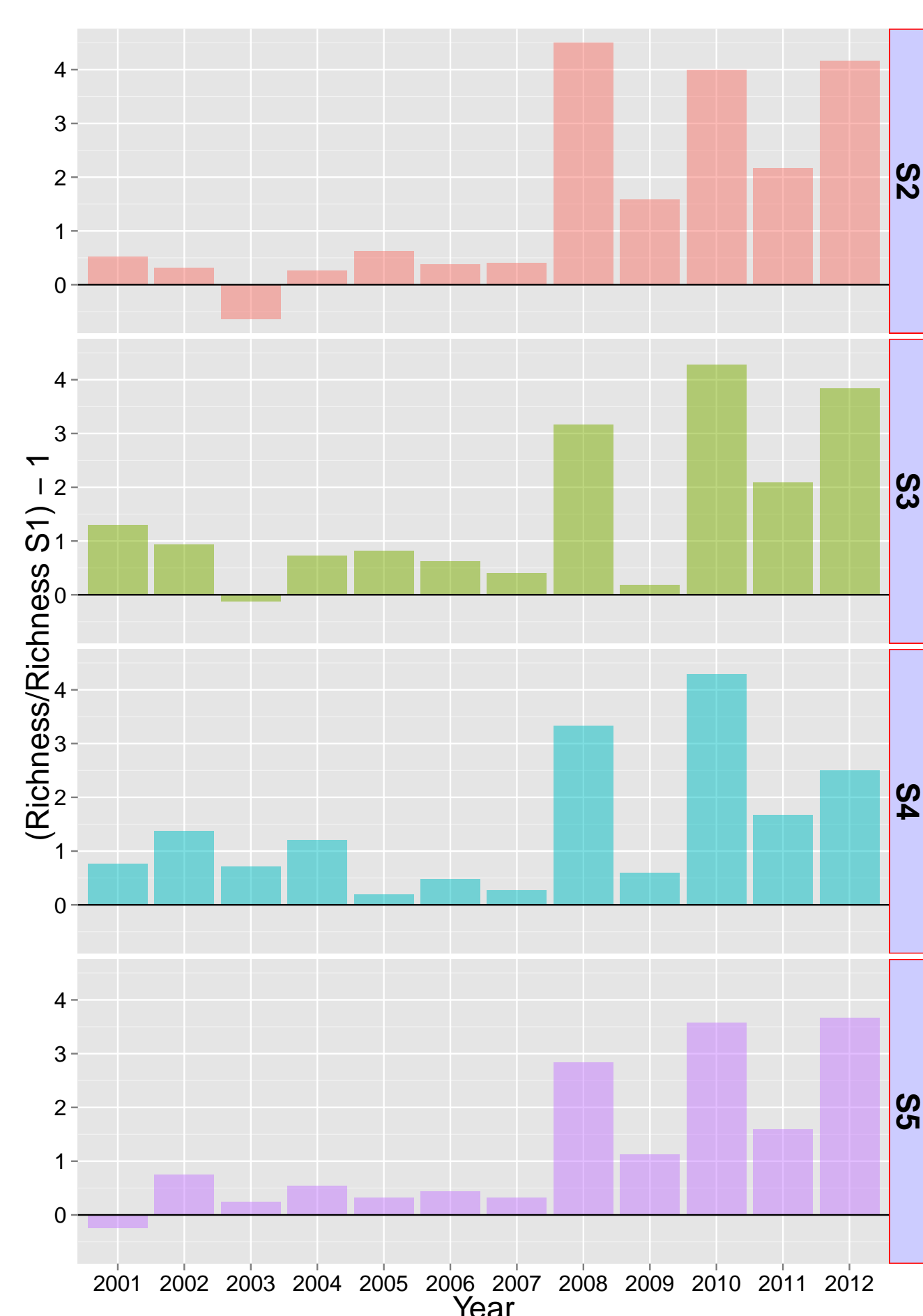


Figure 2: Total densities of weeds on the four IWM systems (S2-S5); S1 as reference

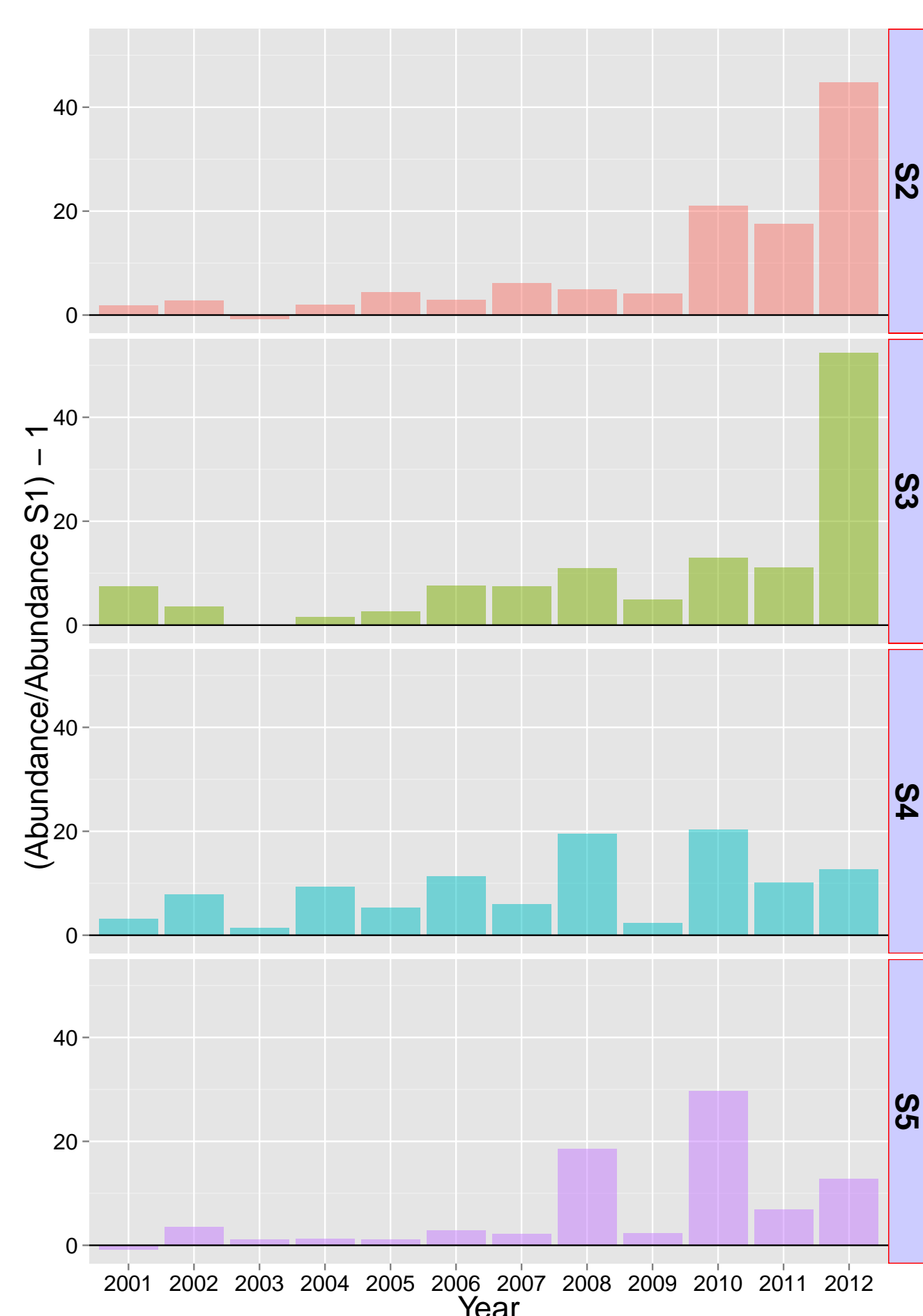


Figure 3: Species accumulation curves (Coleman et al. (1982) expected SAC)

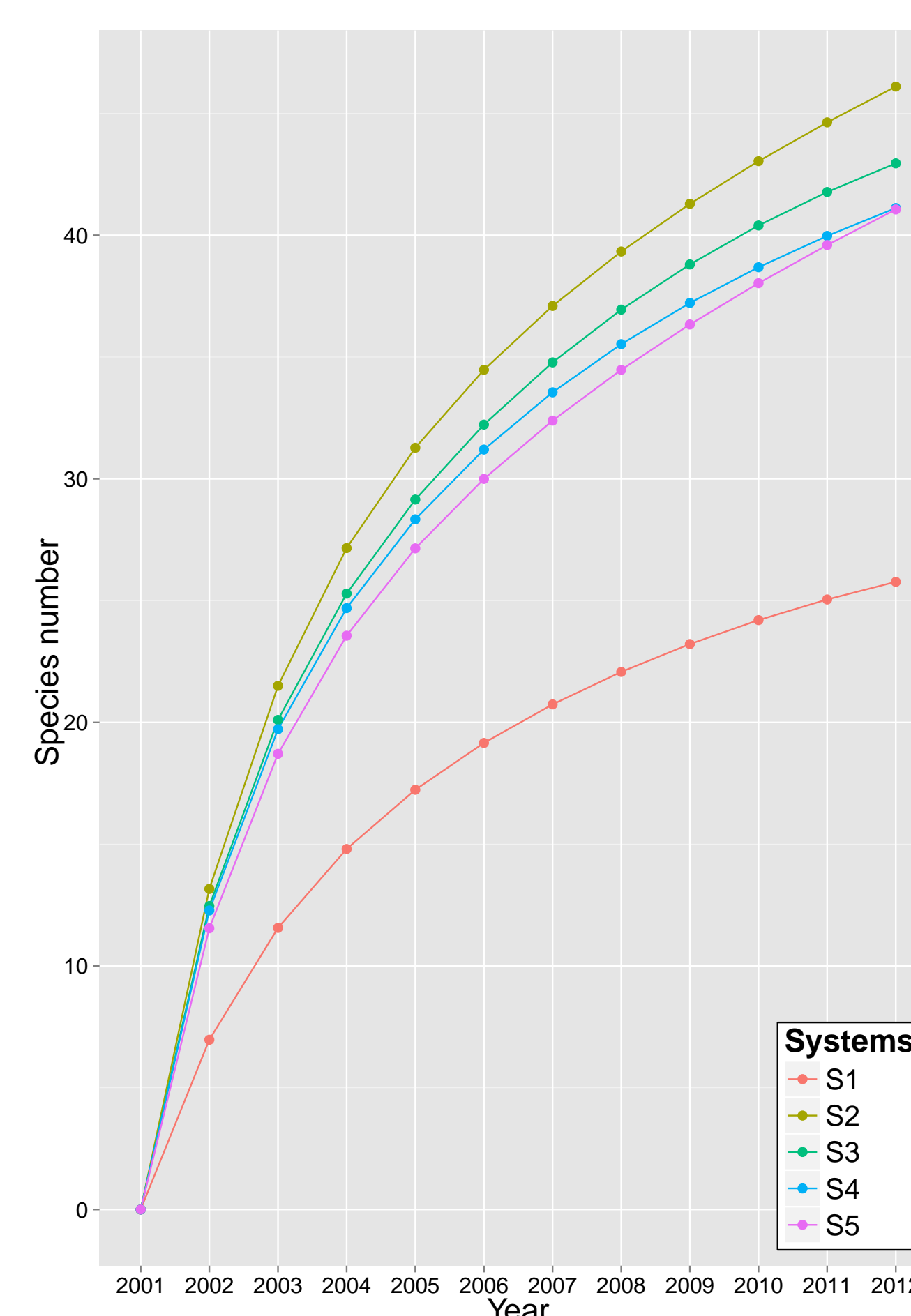
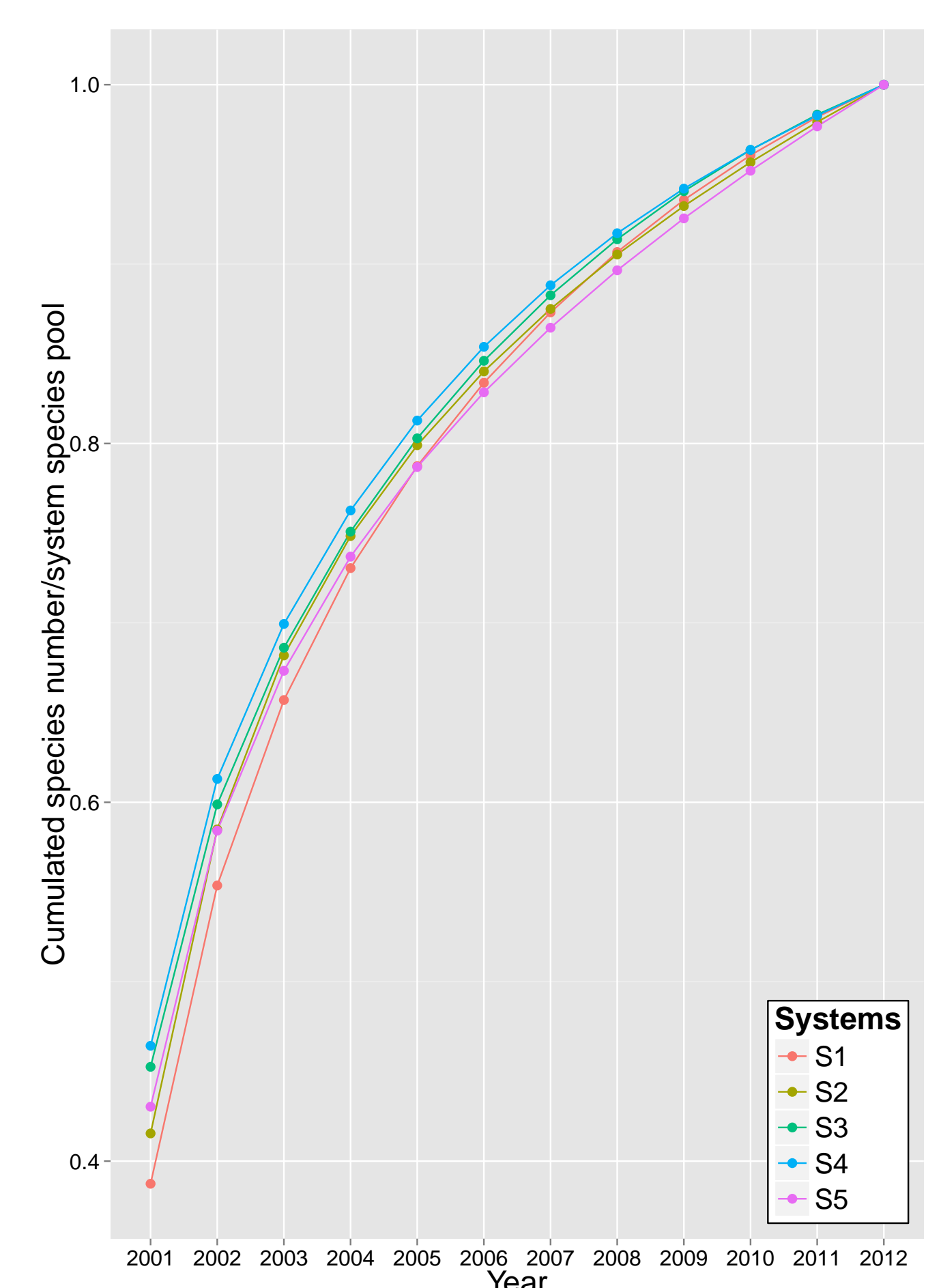


Figure 4: Species accumulation curves (Coleman et al. (1982) expected SAC) relative to γ system richness



Reference : Coleman, B.D, Mares, M.A., Willis, M.R. & Hsieh, Y. (1982). Randomness, area and species richness. *Ecology* **63**: 1121–1133.

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