Ezard, Cote & Pelletier: Eco-evolutionary dynamics: disentangling phenotypic, environmental and population fluctuations

Electronic Supplementary Material 1: Study populations.

The main characteristics of our five study populations are summarized in Table 1. Here we provide brief descriptions and details of capture and marking methods for each study area. More information on the study areas and monitoring programs has already been published elsewhere (Clutton-Brock & Pemberton 2004; Festa-Bianchet 1986; Festa-Bianchet & Côté 2008; Gaillard et al. 1993; Jorgenson et al. 1997). In all these populations, census or recaptured of marked animals are used to monitored recruitment, survival and population size. Significant outliers were assessed according to Fox (pp. 206, 2002) and removed to ensure diagnostic plots that did not reveal systematic bias.

Bighorn sheep

This species was monitored at two different study sites in the Canadian Rockies. The long-term monitoring at Ram Mountain (52° N 115° W, elevation 1082-2173m) was initiated in 1971 by the Alberta government. Each year, animals are trapped in a corral trap baited with salt (from May to the end of September). At the first capture, animals are marked (using plastic ear tags and collars), a tissue sample is collected (for paternity analyses) and morphological measurements (such as body weight (kg)) are taken. More than 97% of animals in this population are individually recognizable in each year (Jorgenson et al. 1997). The monitoring of the Sheep River population (50° N, 114° W, elevation 1420 to 2550 m) started in 1981. Individuals at Sheep River are usually captured only once in their lifetime, which occurs in autumn at 6 months of age using chemical immobilization. At capture, animals are weighed, measured and marked. As at Ram mountain, all sheep are marked using plastic collared ear tags and more than 95% of the population is individually recognizable (Loison et al. 1999). 1989 at Sheep River and 1994 and 2007 at Ram Mountain were significant outliers for the juvenile mass analyses; 1986, 2002 and 2004 (the latter two both years of predator presence, Festa-Bianchet et al. 2006) were significant outliers for the environmental analysis.

Mountain goat

The population of Mountain goats is also located in the Canadian Rockies (54° N, 119° W, elevation 1700-2170 m). The monitoring at Caw Ridge was initiated in 1988. From May to late September, goats are captured using box traps baited with salt. The proportion of marked adults increased from 31% to 94% over the study, and was over 70% after 1990 (Festa-Bianchet et al. 2003). Yearlings are marked with small plastic ear tags and adults with visual collars or ear tags. Kids are not captured because of the high risk of kid abandonment (Côté et al. 1998). Goats are weighed using spring scales at capture and platform scales (located near the traps). 2002 was a significant outlier for the juvenile mass analysis and 1999 for the environmental analysis only.

Roe deer

The roe deer population of Trois-Fontaines (48° N, 3° E), France, has been intensively monitored by capture-mark-recapture since 1976. Captures are made each

winter (January–February) using drive nets. Roe deer are driven into the nets by beaters and handled immediately after capture. Animals caught are individually marked with ear tags and numbered collars, then released in the study site. Because a high proportion of deer are marked (>70%) reliable estimates of population size are available (Festa-Bianchet et al. 2003; Gaillard et al. 1993). 1990 was a significant outlier for the environmental analysis only.

Soay sheep

This population inhabits the Village Bay area of the island Hirta in the St-Kilda archipelago, Scotland (57° N, 08° W). The sheep have been individually monitored since 1985 and more than 95% of individuals within the study area are marked using plastic ear tags. In August of each year, resident sheep are captured using net traps, marked and morphological measurements are taken. 2001 was a significant outlier for the juvenile mass analysis and was excluded from analysis. Foot and mouth disease on the mainland prevented the vast majority of data collection in this year (Clutton-Brock & Pemberton 2004)

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