Introduction

Mate choice and intrasexual competition are major components of sexual selection. The outcome of intrasexual competition is usually decided by the relative strengths of competitors, which can often be unambiguously measured by their relative sizes (e.g. Kodric-Brown, 1977; Howard & Kluge, 1985; Barlow et al., 1986; McLain & Boromisa, 1987). In contrast, mate choice is often considered to be independent of the physical and/or behavioural characteristics of the sex making the choice; criteria of choice such as mate size, dominance and parental care ability are usually not considered dependent on the characteristics of those selecting mates (see Searcy, 1982; Halliday, 1983; but see also Burley, 1977; Parker, 1983). Mate choice based on inbreeding avoidance is a rare example of choice dependent on characters relative between the sexes (e.g. Bateson, 1983; Smith & Ayasse, 1987).

The number of mates available to individuals often differs among members of a population because of the effects of intrasexual competition (e.g. Le Boeuf, 1974; Howard, 1978; Davies & Halliday, 1979; Downhower et al., 1983; McLain & Boromisa, 1987). While there is much evidence to suggest that such competition can lead to the evolution of alternative strategies for seeking mates (e.g. Howard, 1978; Davies &
Halliday, 1979; Rubenstein, 1980; Dunbar, 1982; Dominey, 1984; Gross, 1985), there is little evidence to suggest it can lead to the evolution of varying strategies of mate preference (what mates are preferred). Where there are immediate selective advantages associated with discriminating choice, all individuals, independent of their relative strength, are usually assumed to prefer the same potential mates. However, intrasexual competition can cause the variance in expected reproductive success to differ among members of the sex in question (if they mate at random with those individuals available to them). For example, if the strongest individuals have the widest range of potential mates (by virtue of their competitive superiority and/or preference by the opposite sex; e.g. Hanson & Smith, 1967; Le Boeuf, 1974; Burley, 1977; Cox, 1981) then the variance in the expected reproductive success of these individuals if they mated at random is likely to be greater than that of the weakest individuals. Simply, the strongest individuals could potentially mate with the highest and lowest quality mates whereas the weakest individuals are usually limited to the lowest quality mates. Consequently, the strongest individuals within a sex may be expected to be more selective, having more to gain through such selectivity. Thus, selection might be expected to favour mate choice strategies that are based not only on the characters of potential mates but also on the relative strength of the choosing individual.

Previous work on male choice in fishes, including salmon, suggests that males, independent of size, prefer the largest of available females, probably because of the strong relationship between female size and fecundity (Hanson & Smith, 1967; McCart, 1970; Downhower & Brown, 1981; Rowland, 1982; Loiselle, 1982; Sargent et al., 1986; Berglund et al., 1986). However, there is considerable evidence that the range of available mates increases with male size in fishes because of the effects of size in male intrasexual competition (Hanson & Smith, 1967; Kodric-Brown, 1977; Fricke, 1980; Thresher & Moyer, 1983; Downhower et al., 1983) and female preference for large and/or competitively superior males (Schroder, 1981; Downhower et al., 1983; Berglund et al., 1986). Therefore, we might expect to see variable mate choice strategies dependent on male size in fishes.

In a series of five experiments, I tested whether non-anadromous sockeye salmon males, Oncorhynchus nerka (hereafter referred to as kokanee), select females based on their absolute size or on their size relative to that of the male. If male choice has evolved in response to the variance in mate quality of available females rather than to the variance