**Introduction** -Male courtship evolution is historically considered to be driven by female mate selection, but may also be dependent on male investment decisions in spiders. Life history traits include all survival and reproductive strategies taken by organisms, such as sex ratios, growth rates or courtship behaviours (Brown and Choe, 2019). As inheritable characteristics, they are under sexual selection and their evolution follows fitness maximization (Brommer, 2000; Brown and Choe, 2019).

Reproductive behaviour evolution is mainly driven by intersexual selection, as a result of an asymmetry between sexes in their time and energic investment in reproduction and courtship. Females are typically limited by their number of gametes and the high energic cost associated with reproduction, whereas males are less limited by gamete number and tend to maximise their reproductive success by increasing their number of mating partners (Andersson, 1996; Darwin, 1981). This asymmetry in reproductive investment often results in females being choosy of their mates, which leads to selective pressure on courtship behaviours (Johnstone, 1995). Courtship should thus be expected to evolve as an indicator of male reproductive value for females (Eberhard et al., 2020).

Nevertheless, studies performed on Arthropods have attempted to describe the existence of an investment choice in males concerning female quality, through her weight and mating state (*i.e.* virgin or already mated) (Briceño and Eberhard, 2002; Engqvist, 2009). Notably, it has been shown that males can adjust the amount of sperm they ejaculate (Wedell et al., 2002). Thus, male reproductive behaviours are also dependent on the female reproductive value, as evolutionary compromises between sperm competition (*i.e.* intrasexual selection) and future mating opportunities (Parker, 1970).

In many spider species, sexual cannibalism by females has been described during reproduction (Buskirk et al., 1984; Robinson, 1982). Therefore, male courtship serves to ensure reproduction (Arnqvist and Rowe, 2005), but also reduce the risk of cannibalism (Herberstein et al., 2002).

The courtship and mating behaviours of some spider families such as wolf spiders (Lycosidae) and jumping spiders (Salticidae) are reasonably well described. However, little is known about the Pisauridae family. Furthermore, no study has investigated the impact of male investment decisions on spider courtship behaviours.

The New Zealand fishing spider *Dolomedes minor* (Pisauridae) lives in near-water habitat vegetation and can move on the water surface to find prey and avoid predators (Vink and Dupérré, 2010). Studies on this genushave already described the occurrence of sexual cannibalism (Zimmermann and Spence, 1989), as well as the importance of vibrational signals in their predation (Bleckmann and Lotz, 1987) and reproduction (Arnqvist, 1992; Roland and Rovner, 1983), but very little is known on this specific species.

The purpose of this study is to assess if males of *D. minor* adjust their courtship behaviour depending on female mating status. This, as an evolutionary compromise between investing less when sperm competition occurs, and avoiding being cannibalized. It is expected that some courtship behaviours might be used to ensure reproductive success, while others prevent female aggressiveness. Males involved in reproduction with an already mated female would thus have more interest in increasing their signals to avoid being cannibalised, to the detriment of the ones ensuring copulation. Consequently, it is expected that these males will allocate different times in their courtship behaviours compared to others, but also spend less time in courtship, copulate less and get less often cannibalised. They might also exhibit some particular behavioural sequences leading to the end of interaction with less risk of sexual cannibalism.

To conduct this study, mating experiments will be performed between *D. minor* males and unmated and already mated females. Courtship behaviours during trials will be described and scored to provide a first complete ethogram of *Dolomedes* reproductive behaviours. Mating outcomes, time management and courtship behavioural sequences of males will be then compared depending on the female mating state.

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