**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 behaviours evolution is mainly driven by intersexual selection, as a result of an asymmetry between sexes in their investment. Females are limited by their number of gametes and the high energic cost associated with reproduction, whereas males are only limited by their number of mating (Andersson, 1996; Darwin, 1981). Therefore, females often have to choose between several males, which leads to selective pressure on courtship behaviour (Johnstone, 1995). Courtship should thus be expected to evolve as an indicator of males reproductive value for females (Eberhard et al., 2020).

Nevertheless, studies performed on Arthropod species have attempted to describe the existence of an investment choice in males with regard to 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 are able to adjust the amount of sperm they ejaculate (Wedell et al., 2002). Thus, male reproductive behaviours are also dependant on 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). Male courtship therefore serve to ensure reproduction (Arnqvist and Rowe, 2005), but also reduce risk of cannibalism (Herberstein et al., 2002). Even if reproductive behaviours are well described in some spider families such as wolf spiders (Lycosidae) or jumping spiders (Salticidae), little is known in the Pisauridae family. Furthermore, no study has investigated the impact of male investment decisions in spider courtship behaviour.

The New Zealand fishing spiders *Dolomedes minor* (Pisauridae) live in near-water habitat vegetations and are able to move on water surface to find preys and avoid predators (Vink and Dupérré, 2010). Studies in this *genus* have 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* can adjust their courtship depending on the female mating state. This, as an evolutionary compromise between investing less when sperm competition occurs, and avoid being cannibalized. It is expected that some courtship behaviours might be used to ensure reproductive success, while others to prevent female aggressiveness. Males involved in reproduction with an already mated females 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 virgin or already mated females. Courtship behaviours during trials will be described and scored with the aim of providing a first complete ethogram in *Dolomedes* spiders. Mating outcomes, time management and courtship behavioural sequences of males will be then compared depending on the female mating state.

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