

S1A.3 How temperature stress reflects the behaviour of sit-and-wait Namibian spiders

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In extreme environments like hot deserts, temperature represents a stress factor playing a key role in determining any activity in the animal world, from digging to foraging and from mating to reproduction as well as it is a determining factor in forcing functional traits. Some *Ariadna* spiders inhabiting the Namib Desert excavate nearly vertical cylindrical burrows thickly lined with silk. We have chosen for such natural microcosms, characterized by rather small burrows with silk, in one of the hottest deserts in the world. Burrows' depth and amino acid composition of the silk mirror the climatic conditions of the investigated sites. Alanine and Glycine are the most abundant amino acids, with a prevalence of Alanine, constituting together at least 61% of the chemical composition of the protein material, differently from what occurs in known spidroins. High percentages of Proline, Serine and Threonine and low percentages of Leucine complete the peculiarity of these proteins. All their thermal properties were investigated by differential scanning calorimetry, showing that there are significant differences in their amino acid assembly due to the environmental habitat features like soil granulometry and surface temperature. Actually, temperature matters the most. Together, these ecological processes make the actual habitat temperature at the bottom of the burrow the strongest determinant for a constant metabolic rate of soil ectotherms as computed according to the Metabolic Theory of Ecology (MTE). This MTE approach is in fact appropriate to assess faunal thermoregulation. Here we show that these peculiar sit-and-wait spiders are able to thermoregulate behaviourally by digging until the most appropriate soil depth.