Light and temperature interactions in promoting lettuce seed germination

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Lettuce seeds (*Lactuca sativa* var. acephala cv. 'Tango') were used with the objective of determining the effect of temperature, light and their interactions in promoting germination. Under standard optimal conditions (20ºC, constant light) the seed presented 100% germination (radicle emergence 5 days after sowing). Different treatments evaluated germination under dark conditions, with or without a light break (red light, 28.8 $mmol \cdot m^{-2}$) 48 h after sowing, and with different combination of temperatures pre (soaking temperature, ST) and post (germination temperature, GT) the light break (LB). Germination at constant 20ºC without LB was less than 5%, and with LB it was around 30%. However, germination was close to 100% at GT of 20ºC when LB was applied after a ST of 10ºC, and around 50% under the same conditions but without LB. When GT was 30ºC and LB was applied, germination was less than 3% with ST= 30ºC, less than 10% with ST=20ºC, and around 100% when ST=10ºC. With ST and GT of 10ºC and 30ºC, respectively, and no LB, germination was less than 5%. Germination at 10ºC constant, with and without LB was around 90% and 0% respectively. When ST was 40ºC and LB was applied, germination was around 40% at GT= 20ºC, but less that 3% with GT= 30ºC. In summary, a severe inhibition of germination was observed when seeds were germinated in dark, which was partially reversed by either a light treatment or soaking at 10ºC, and fully reversed when both treatments were applied together. Inhibition of lettuce germination at 30ºC was observed when this temperature was applied after a light treatment, but not when applied before. Possible implications of these germination results for the phytochrome mechanism of action are discussed.