HIGHLIGHTS:

* Spring freezing events that occur after plants have initiated budburst – which are known as false springs – can be damaging to many plants, with large ecological and economic impacts.
* Plants employ avoidance and tolerance strategies to avoid or tolerate false springs but, with climate change advancing spring phenology, the effectiveness of these strategies may rapidly change.
* Current studies largely simplify the definition of a false spring and fail to incorporate critical factors such as location within a forest or canopy, interspecific variation in avoidance and tolerance strategies, freezing temperature thresholds, and regional effects.
* We highlight the complexity of factors that ultimately drive a plant’s false spring risk and provide a road map for improved metrics to rapidly advance progress in ecological, plant physiological and climate change studies.