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Unfolding molecular switches in plant heat stress resistance: A comprehensive review

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摘要	Global warming due to climate change affects plant growth and development throughout its life cycle. Adds to this, the frequent occurrence of heat waves is drastically reducing the global crop yield. Molecular plant scientists can help crop breeders by providing genetic markers associated with stress resistance. Plant heat stress response (HSR), however, is a multi-factorial trait and using a single stress resistance trait might not be ideal to develop thermotolerant crops. Transcription factors participate in regulation of plant biological processes and environmental stress responses. Recent studies have revealed that plant HSR is precisely regulated by the complex web of transcription factors from various families. These transcription factors enhance plant heat stress tolerance by regulating the expression level of several stress-responsive genes independently or in cross talk with different other transcription factors. This review explores how signaling pathways triggered by heat stress are regulated by multiple transcription factor families. To our knowledge, we for the first time analyze the role of major transcription factor families in plant HSR along with their regulatory mechanisms. In the end, we will also discuss the potential of emerging technologies to improve thermotolerance in plants.
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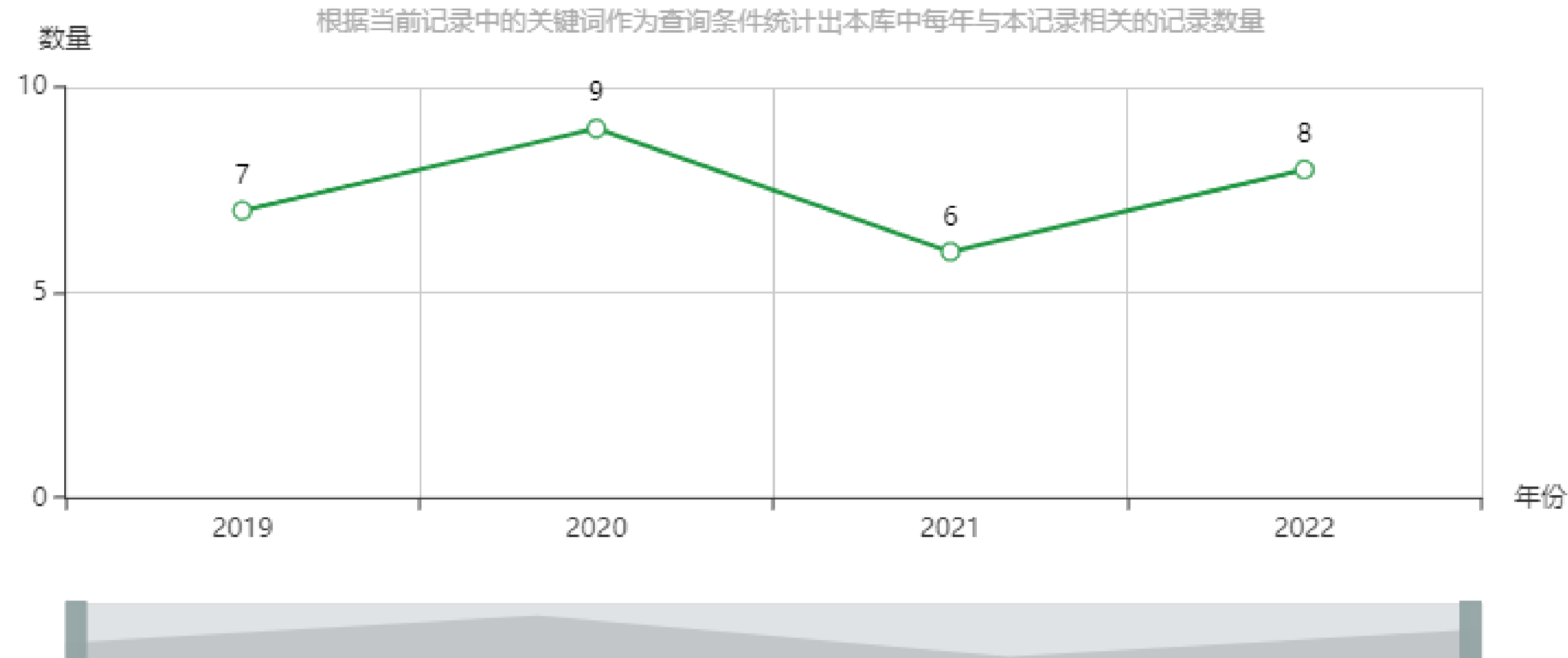
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