生态学报 Acta Ecologica Sinica

顾润源,周伟灿,白美兰,李喜仓,邸瑞琦,杨晶.气候变化对内蒙古草原典型植物物候的影响.生态学报,2012,32(3):767~776

气候变化对内蒙古草原典型植物物候的影响

Impacts of climate change on phenological phase of herb in the main grassland in Inner Mongolia

投稿时间：2011-6-30 最后修改时间：2011-11-18

DOI：10.5846/stxb201106300979

中文关键词: 草原类型 植物物候 气候变化 区域响应

English Keywords:grassland type phenological phase climate change phenological phase response

基金项目:中国气象局气候变化专项(CCSF2010-1);国家科技支撑计划(2007BAC29B04)

作者	单位	E-mail
顾润源	南京信息工程大学, 南京 210044; 内蒙古自治区气候中心, 呼和浩特 010051	
周伟灿	南京信息工程大学, 南京 210044	
白美兰	内蒙古自治区气候中心, 呼和浩特 010051	nmghrq@sina.com
李喜仓	内蒙古自治区气候中心, 呼和浩特 010051	
邸瑞琦	内蒙古自治区气候中心, 呼和浩特 010051	
杨晶	内蒙古自治区气候中心, 呼和浩特 010051	

中文摘要:

自然物候期是气候变化最直观的植物信号记录,自然物候变化是气候与自然环境变化的综合指标。基于1983-2009年内蒙古草甸草原、典型草原和荒漠草原区典型植物马兰草、霸王、贝加尔针茅和羊草生长期物候观测资料和同时段的气象观测资料,利用数理统计等方法,分析了不同草原区典型植物物候期与气候要素间的相互关系,结果表明:(1)1983-2009年内蒙古草原区植物物候期总体呈提前趋势,但地域差异明显,典型草原区植物萌芽返青、开花及黄枯期等物候提早趋势最为明显,说明不同草原区植物物候对气候变暖的区域响应不同。(2)内蒙古草原区植物物候期与气候变化密切相关。春季3-5月累积气温与植物萌芽返青期和开花期呈显著负相关,与日照时数为正相关,降水量对其影响不同草原区差异较大。荒漠草原和典型草原区植物黄枯期早晚与黄枯前1-2个月平均气温呈显著负相关,草甸草原区植物黄枯期与前1-2个月的降水量和日照时数有关,与气温关系不显著。(3)随着气候变暖,马兰草生长期缩短,霸王、贝加尔针茅和羊草生长期延长,其中典型草原区主要植物针茅生长季延长趋势最为明显,荒漠草原次之,草甸草原延长最少。

English Summary:

Phenology is the most intuitive signal of climate change. Changes in phenology reflect changes in climate and the natural environment. To both understand and manage the impacts of climate change on ecosystems we need to search for ways to forecast climate trends and for ways to mitigate climatic deterioration. We used statistical analysis, meteorological data and typical plant phenological periods in different grasslands to study the relationships between phenology and meteorology. We studied *Kalimeris indica* (L.) Sch.-Bip., *Sarcozygium xanthoxylon* Bunge, *Stipa baicalensis* Roshev and *Leymus chinensis* (Trin.) Tzvel. in meadow grasslands, typical grasslands and desert grasslands in Inner Mongolia from 1983 to 2009. First, the analysis considered the phenology of these plants of the grasslands of Inner Mongolia, looking at three stages, the return of green sprouts, the blossoming stage and the stage at which the plants became yellow and withered. Plants in different grasslands are responding differently to climate warming. When the average temperature in spring (March to May) increases by 1℃, the flowering period will be earlier by 7.2, 4.1, and 2.5 days in typical grasslands, desert grasslands and meadow grasslands, respectively. Second, the phenological phases of these grassland plants are closely related to climate change. The date when green sprouts appear and blossoms form is significantly negatively correlated with the cumulative temperature in spring (March to May), and is positively correlated to daylength. These dates are also influenced by precipitation in different grasslands. The date of the yellow withered stage is negatively correlated with average monthly temperature before withering and yellowing in desert grassland and typical grassland. The date of the yellow withered stage is closely related to precipitation and daylength prior to withering and yellowing in meadow grasslands, but is not significantly related to temperature. Third, with climate warming, the growing period for *K. indica* has shortened. The growing period for *S. xanthoxylon*, *S. baicalensis* and *L. chinensis* has lengthened with the length of the growing period for *S. baicalensis* in typical grasslands increasing the most. The duration of the growing period in desert grasslands also increased while the growing period in meadow grasslands showed the least amount of lengthening.

地址:北京海淀区双清路18号 邮编:100085 电话:010-62941099 E-mail : shengtaixuebao@rcees.ac.cn