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## 君主绢蝶的生物学及生境需求

### Biological characteristics and habitat requirements of *Parnassius imperator* (Lepidoptera: Parnassidae)

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作者 单位

E-mail

方健惠 北京林业大学林学院省部共建森林培育与保护教育部重点实验室, 北京 100083; 甘肃省森林病虫害防治检疫站, 兰州 730050

骆有庆 北京林业大学林学院省部共建森林培育与保护教育部重点实验室, 北京 100083

yqluo@bjfu.edu.cn

牛犇 甘肃省森林病虫害防治检疫站, 兰州 730050

屠爱群 甘肃省森林病虫害防治检疫站, 兰州 730050

赵龙 甘肃省森林病虫害防治检疫站, 兰州 730050

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#### 中文摘要:

在甘肃省永靖县境内通过野外设点观察、样线调查及室内饲养等方法研究了君主绢蝶的生物学特性及其生境需求,分析了其种群趋势及波动的原因,提出了保护措施。(1)君主绢蝶是中国特有种,在甘肃永靖县1年1代,以卵越冬,卵多产于寄主植物灰绿黄堇 *Corydalis adunca* (也是中国特有种)附近的岩石壁上,翌年3月中旬卵孵化。幼虫4龄,平均历期为52d,3月下旬至6月下旬都可见到幼虫。蛹期平均为47d。5月初始见其成虫,成虫飞翔迅速,7月中旬至8月中旬为成虫高峰期,至9月下旬仍可见成虫活动。卵期一般为8个月。(2)君主绢蝶在永靖县牙沟生境内是一个优势种群,成虫喜欢飞翔于有裸露岩石的沟谷,其幼虫则生存于阳光充足、气候干燥、有大量寄主植物的阳坡及半阳坡。君主绢蝶与其寄主植物灰绿黄堇的分布范围在中国相一致,二者之间有紧密的协同进化关系。(3)在永靖县和甘南合作市分布的君主绢蝶是两个亚种,在永靖县牙沟地区发生的是君主绢蝶兰州亚种 *Parnassius imperator gigas* Kotsch,在合作市发生的是君主绢蝶祁连山亚种 *P. imperator regulus* (Bryk et Eisner)。(4)极端的异常气候(强降温、霜冻、降雪)是影响君主绢蝶种群数量下降的主要因子,人类活动的干扰是另一个影响君主绢蝶生存的主要威胁。(5)保护措施建议:保护生境和减少人为干扰是两个最主要的促进绢蝶种群恢复的方法;强调对绢蝶种群进行长期监测,并开展生境丧失、气候变化等对绢蝶的影响研究。

#### English Summary:


We studied biological characteristics and habitat requirements of *Parnassius imperator* in Yagou, Yongjing County. We also analyzed population trend and key factors responsible for its fluctuation. Our research methods included for example transect survey, observation at sample plots, indoor breeding, etc.

1) *P. imperator* is an endemic species to China. It is univoltine in Yongjing County, and overwinters in egg stage on rocks nearby host plants *Corydalis adunca* (also endemic to China). Eggs hatch in mid-March the following year. The larvae stage includes 4 instars and last for 52 days. Duration of the larva period is from late March to late June. The pupae stage lasts about 47 days, and larvae pupate in early May. Adults emerge at the beginning of May and can fly fast. Peak quantity of adults ranges from mid-July to mid-August, however adults can still be found in late September. The egg stage lasts about eight months.

2) *P. imperator* is a dominant species in Yagou, Yongjing County. Adults like to stay and fly in valley with bare rocks and shrubs, larvae are found on sunny and semi-sunny slopes. Geographic distribution of *P. imperator* and its host plant *C. adunca* overlaps in China. This explains their close co-evolutionary relationship.

3) Two subspecies of *P. imperator*. *P. imperator gigas* Kotsch, occurred in Yongjing county and *P. imperator regulus* (Bryk et Eisner) in Hezuo city.

4) Extremely abnormal climate, for example, Strong cooling, frost or snow, is the main factor that affects the population decline of *P. imperator*. Human disturbance is another threat affecting survival of *P. imperator*. 5) Conversation measures should focus on conservation of habitats of *Parnassius sp.*, and reduction of human disturbance to support survival of the population in Yagou. We also stress the need for long term population monitoring and research on impact of climate change and habitat loss.

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