

研究报告

## 旱作条件下紫花苜蓿光合蒸腾日变化与环境因子的关系

刘玉华<sup>1,2</sup>, 史纪安<sup>1,2</sup>, 贾志宽<sup>1</sup>, 韩清芳<sup>1</sup>

<sup>1</sup>西北农林科技大学农学院, 杨凌 712100; <sup>2</sup>河南科技大学农学院, 洛阳 471003

收稿日期 2005-9-14 修回日期 2006-7-28 网络版发布日期 接受日期

**摘要** 在旱作条件下测定了4年生紫花苜蓿初花期光合蒸腾特性, 以及光合有效辐射(PAR)、田间CO<sub>2</sub>浓度(C<sub>a</sub>)、相对湿度(RH)、大气温度(T<sub>a</sub>)等环境因子的日变化, 并采用相关系数、途径系数和决策系数分析了紫花苜蓿光合蒸腾特性日变化与环境因子的关系. 结果表明, 对光合速率日变化直接影响最大的因子是T<sub>a</sub>, 而RH、PAR和C<sub>a</sub>主要是通过T<sub>a</sub>而间接地影响光合速率日变化; 对蒸腾速率日变化直接影响最大的因子是PAR, 而RH、T<sub>a</sub>和C<sub>a</sub>主要是通过PAR而间接地影响蒸腾速率日变化. 对光合蒸腾特性起主要决定作用的因子是PAR, 主要限制因子是T<sub>a</sub>.

**关键词** [光合速率](#) [蒸腾速率](#) [环境因子](#) [紫花苜蓿](#) [旱作](#)

分类号

## Diurnal dynamics of photosynthetic and transpiration rates of alfalfa under dry farming and their relationships with environmental factors

LIU Yuhua<sup>1, 2</sup>, SHI Ji'an<sup>1, 2</sup>, JIA Zhikuan<sup>1</sup>, HAN Qingfang<sup>1</sup>

<sup>1</sup>College of Agronomy, Northwest Sci-Tech University of Agriculture and Forestry, Yangling 712100, China; <sup>2</sup>College of Agronomy, Henan University of Science and Technology, Luoyang 471003, China

### Abstract

In this paper, the diurnal dynamics of photosynthetic rate ( $P_n$ ) and transpiration rate ( $T_r$ ) of four years planted alfalfa under dry farming, as well as those of photosynthetic active radiation (PAR), CO<sub>2</sub> concentration in field ( $C_a$ ), relative humidity (RH) and air temperature ( $T_a$ ) were measured, and the relationships between the diurnal dynamics of  $P_n$ ,  $T_r$  and climatic factors were analyzed by correlation coefficient, path coefficient, and decision coefficient analyses. The results showed that  $T_a$  had the greatest effect on the diurnal dynamics of  $P_n$ , while RH, PAR and  $C_a$  affected  $P_n$  mainly through their acting on  $T_a$ . PAR had the greatest effect on the diurnal changes of  $T_r$ , and RH,  $T_a$  and  $C_a$  affected  $T_r$  indirectly by acting on PAR. For the characteristics of photosynthesis and transpiration, PAR was the primary determining factor, and  $T_a$  was the main limiting factor.

**Key words** [Photosynthetic rate](#) [Transpiration rate](#) [Environment factor](#) [Alfalfa](#) [Dry farming](#)

DOI:

通讯作者

### 扩展功能

#### 本文信息

- ▶ [Supporting info](#)
- ▶ [PDF\(347KB\)](#)
- ▶ [\[HTML全文\]\(0KB\)](#)
- ▶ [参考文献](#)

#### 服务与反馈

- ▶ [把本文推荐给朋友](#)
- ▶ [加入我的书架](#)
- ▶ [加入引用管理器](#)
- ▶ [复制索引](#)
- ▶ [Email Alert](#)
- ▶ [文章反馈](#)
- ▶ [浏览反馈信息](#)

#### 相关信息

- ▶ [本刊中 包含“光合速率”的相关文章](#)
- ▶ [本文作者相关文章](#)

- [刘玉华](#)
- [史纪安](#)
- [贾志宽](#)
- [韩清芳](#)