A Big Earth Data Platform for Three Poles

**Photosynthesis dataset of populus euphratica in the downstream of Tarim River**

1、Description

Photosynthesis of Populus euphratica is mainly affected by atmospheric CO2 concentration, intercellular CO2 concentration, photosynthetic active radiation and leaf temperature when groundwater level is deep and shallow, but with the decrease of groundwater level, atmospheric CO2 concentration and photosynthetic active radiation become the main factors limiting photosynthesis of Populus euphratica. This is because when the groundwater depth is low, the groundwater supply is sufficient, and the leaves are not limited by the water supply. When the photosynthetic effective radiation is strong, the air temperature and leaf temperature are relatively high, and the relative humidity of the air is small. At this time, the photosynthesis and transpiration are both strong. Stomata mainly adapt to strong transpiration by increasing stomatal conductance, i.e. reducing stomatal resistance. At the same time, CO2 in the air continuously enters cells through open stomata, and becomes the raw material for photosynthesis together with intercellular CO2, thus causing the decrease of CO2 concentration in the air and intercellular space, which is the CO2 supply limitation that often causes photosynthesis inhibition in photosynthesis. However, when subjected to water stress, the supply of CO2 is no longer the main reason for limiting photosynthesis. When the photosynthetic effective radiation increases, the net photosynthetic rate, transpiration rate and stomatal conductance all increase. When the supply of CO2 concentration is relatively sufficient, photosynthesis will be slowed down due to the shortage of water, another necessary raw material for photosynthesis.  
Water use efficiency and water productivity of plants are of great practical significance for measuring and screening species in arid regions.  
The flow rate was 400μmol/ s and the leaf temperature was kept at 26°C using the L I-6400 portable photosynthesis analyzer, the CO2 concentration in the reference chamber was kept at 360μmol/ mol or 720μmol/ mol using the CO2 injection system, and the photosynthetically active radiation (PAR) was set at 2000,1500,1200,1000,500,300,50,0 μ mol/(m2) using the 6400-02B L ED light source. s) 。 Twelve healthy and mature leaves were selected from the east, south, west and north of each Populus euphratica to the middle and upper parts respectively, from 8 :00 to 20 :00, and photosynthetic apparatus Li 6400 (Li 6400, LiCOR, Lincoln, NE, USA) respectively measured the net photosynthetic rate (Pn), transpiration rate (Tr), stomatal conductance (gs) and other gas exchange parameters of each leaf, simultaneously measured the atmospheric CO2 concentration (Ca), intercellular CO2 concentration (Ci), photosynthetic effective radiation (Pa r), atmospheric temperature (T a), leaf surface temperature (Tl), air relative humidity (RH) and other parameters, and repeated readings for each leaf 3 times. Water use efficiency (WUE) = Pn/ Tr, stomatal limitation (Ls )= 1-Ci/Ca.

2、Keywords

Theme：Photosynthetically active radiation,Photosynthesis,Vegetation,Evapotranspiration,Carbon cycle,Populus euphratica  
Discipline：Terrestrial Surface  
Places：Tarim River Basin, Xinjiang  
Time：2003, 2007, 2006, 2004

3、Data details

1.Scale：None

2.Projection：None

3.Filesize：2.2MB

4.Data format：xls

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：42.0 | - |
| west：87.0 | - | east：91.0 |
| - | south：38.5 | - |

5、Time frame:2003-01-07 08:00:00+00:00--2008-01-06 19:59:59+00:00

6、Reference method

References to data:

HAO Xingming, CHEN Yaning. Photosynthesis dataset of populus euphratica in the downstream of Tarim River. A Big Earth Data Platform for Three Poles, doi:10.3972/westdc.010.2013.db2013

References to articles:

7、Supporting project information

8、Data resource provider

name: CHEN Yaning  
unit: 中国科学院新疆生态与地理研究所  
email: chenyn@ms.xjb.ac.cn  
  
name: HAO Xingming  
unit: 中国科学院新疆生态与地理研究所  
email: haoxm@ms.xjb.ac.cn