

Table S1. Soil sample sites in Zhengyang county, Zhumadian city, Henan Province and their pedo-climatic characteristics *

| Code site | Sampling sites | Soil type | Longitude and Latitude | Altitude (m) | Sampling date | Average T _{min} °C | Average T _{max} °C | Precipitation (mm) | Crop rotation for sampling sites |
|-----------|-------------------------------------|----------------------|-------------------------------------|--------------|---------------|-----------------------------|-----------------------------|--------------------|----------------------------------|
| ZA | Zhouwan village, Dougou town | Fluvo-aquic soil | N32°22'23.8512" E114°18'59.8536" | 51.9 | 2019.5.28 | 21.4 | 30.1 | 145.0 | wheat-peanut |
| ZB | Zhouwan village, Dougou town | Paddy soil | N32°22'41.286" E114°19'3.6876" | 50.3 | 2019.5.28 | 21.4 | 30.1 | 145.0 | wheat-peanut/ rice-green manure |
| ZC | Dayu village, Lanqing town | Shajiang black soil | N32°27'37.1736" E114°20'11.5656" | 67.8 | 2019.5.29 | 21.3 | 30.2 | 128.5 | wheat-peanut |
| ZD | Wanglaozhuang village, Lanqing town | Yellow cinnamon soil | N32°27'33.0192" E114°20'6.0432" | 74.9 | 2019.5.24 | 21.3 | 30.2 | 128.5 | wheat-peanut |
| ZE | Silou village, Yongxing town | Yellow cinnamon soil | N32°28'57.0504" E114°29'30.5196" | 60.2 | 2019.5.28 | 21.3 | 30.3 | 128.0 | wheat-peanut |
| ZF | Zhangzhai village, Fuzhai town | Yellow cinnamon soil | N32°40'52.23" E114°22'56.2224" | 73.3 | 2019.5.24 | 21.1 | 30.2 | 116.8 | wheat-peanut |

*. Average T_{min}: average of daily minimum temperatures from June to September 2019 for each site. Average T_{max}: average of daily maximum temperatures from June to September 2019 for each site. Precipitation: total precipitations from June to September 2019 for each site.

Table S2. Comparison of the soil physicochemical characteristics in the different sampling sites. Values are average \pm standard deviation of three sub-samples.

| Sampling sites [#] | Soil traits | | | | | |
|-----------------------------|-----------------------------------|----------------------------|---------------------------------|---------------------------------|-----------------|--------------------------------|
| | Organic matter g kg ⁻¹ | Total N g kg ⁻¹ | Available P mg kg ⁻¹ | Available K mg kg ⁻¹ | pH (water) | Total salts g kg ⁻¹ |
| ZA | 11.93 \pm 1.11 | 0.83 \pm 0.01 | 62.50 \pm 1.31 | 78.00 \pm 0.00 | 4.90 \pm 0.10 | 1.30 \pm 0.20 |
| ZB | 20.40 \pm 0.53 | 1.20 \pm 0.03 | 18.07 \pm 0.45 | 97.33 \pm 2.31 | 6.20 \pm 0.00 | 1.27 \pm 0.23 |
| ZC | 16.47 \pm 0.48 | 1.00 \pm 0.04 | 23.47 \pm 2.02 | 96.00 \pm 0.00 | 4.90 \pm 0.10 | 1.23 \pm 0.058 |
| ZD | 18.47 \pm 1.10 | 1.09 \pm 0.04 | 23.90 \pm 0.35 | 92.00 \pm 0.00 | 4.80 \pm 0.00 | 1.50 \pm 0.10 |
| ZE | 21.13 \pm 0.35 | 1.27 \pm 0.02 | 35.27 \pm 3.01 | 106.33 \pm 4.04 | 4.80 \pm 0.00 | 1.07 \pm 0.30 |
| ZF | 15.70 \pm 0.17 | 0.95 \pm 0.05 | 34.47 \pm 2.33 | 98.67 \pm 2.31 | 5.47 \pm 0.15 | 1.77 \pm 0.40 |

[#] One-year rotation (wheat-peanut) except site ZB with a two-year rotation (wheat-peanut and rice-green manure). Code of site: ZA, Zhouwan, Dougou, Zhengyang county; ZB, Zhouwan, Dougou, Zhengyang county; ZC, Dayu, Lanqing, Zhengyang county; ZD, Wanglaozhuang, Lanqing, Zhengyang county; ZE, Silou, Yongxing, Zhengyang county; ZF, Zhangzhai, Fuzhai, Zhengyang county