

## Decay stages and meteorological factors affect microbial community during leaf litter *in situ* decomposition

### Supplementary materials to:

Table S1 *Quercus wutaishanica* sample information

| Sample sites | Altitude (m) | Longitude (°) | Latitude (°) | Average tree height (m) | Coverage (%) | Slope direction |
|--------------|--------------|---------------|--------------|-------------------------|--------------|-----------------|
| Site1        | 1262-1270    | 109°08'58.44" | 36°05'25.39" | 7.35                    | 85           | north           |
| Site2        | 1299-1302    | 109°08'59.21" | 36°05'15.03" | 6.98                    | 84           | south           |
| Site3        | 1262-1272    | 109°09'3.66"  | 36°05'18.59" | 7.53                    | 87           | west            |

Table S2 Leaf litter physicochemical properties in different sampling dates

| Date                       | July (31 days)        | October (125 days) | February (257 days) | May (342 days)    |
|----------------------------|-----------------------|--------------------|---------------------|-------------------|
| OC (g kg <sup>-1</sup> )   | 481.72±25.39a         | 407.66±25.75b      | 372.66±24.69c       | 346.52±9.82d      |
| TN (g kg <sup>-1</sup> )   | 7.29±0.31c            | 9.15±0.44b         | 8.90±0.66b          | 10.20±1.12a       |
| TP (g kg <sup>-1</sup> )   | 0.42±0.052c           | 0.62±0.086b        | 0.76±0.10a          | 0.67±0.083b       |
| C/N                        | 66.06±4.43a           | 44.57±4.29b        | 41.89±4.29b         | 33.97±4.33c       |
| C/P                        | 1136.11±123.11a       | 657.96±129.27b     | 491.56±89.61c       | 520.60±57.22c     |
| MBC (mg kg <sup>-1</sup> ) | 8569.66±1993.78a<br>b | 8705.65±1936.84ab  | 7364.70±1572.41b    | 10576.71±2494.58a |
| MBN (mg kg <sup>-1</sup> ) | 1639.25±399.78b       | 2048.14±514.21ab   | 1767.10±461.61ab    | 2135.97±373.76a   |
| LW (g kg <sup>-1</sup> )   | 13.83±4.85c           | 113.99±30.95a      | 35.52±20.46b        | 18.02±12.45c      |
| pH                         | 5.30±0.0058d          | 5.36±0.015c        | 5.46±0.026b         | 5.83±0.021a       |

Lowercase letters (a, b) indicate a significant difference among seasons ( $p < 0.05$ ). The leaf litter water content expressed as LW

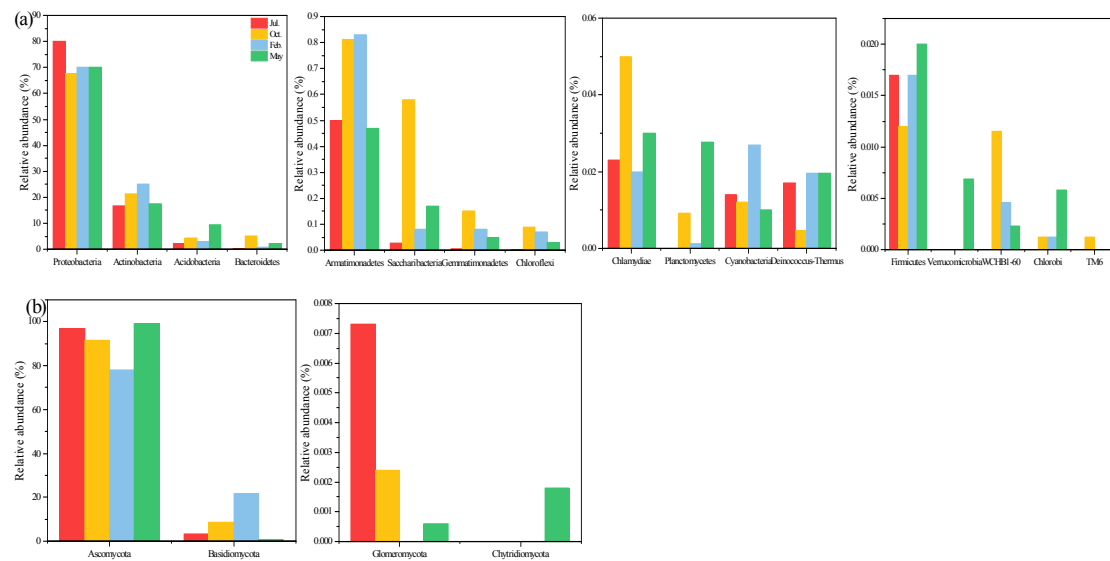
Table S3 Pearson's R and p-values for correlations of leaf litter properties (LW, pH, OC, TN, TP, C: N, C: P, MBC, and MBN) and meteorological factors (precipitation, air temperature, litter layer temperature, relative humidity, sunlight intensity, and net radiation) with microorganisms (OTU level), respectively.

| Mantel-test                  | Bacteria |       | Fungi |       |
|------------------------------|----------|-------|-------|-------|
|                              | r        | p     | r     | p     |
| LW×pH×OC×TN×TP               | 0.378    | 0.015 | 0.311 | 0.015 |
| C/N×C/P                      | 0.393    | 0.015 | 0.328 | 0.020 |
| MBC×MBN                      | 0.311    | 0.017 | 0.169 | 0.084 |
| Total leaf litter properties | 0.412    | 0.014 | 0.334 | 0.009 |
| AT×LT×SI×NR                  | 0.341    | 0.008 | 0.196 | 0.045 |
| RH×PP                        | 0.404    | 0.005 | 0.027 | 0.400 |
| Total meteorological factors | 0.325    | 0.006 | 0.180 | 0.073 |

AT, LT, SI, NR, RH, and PP are abbreviations of air temperature, litter layer temperature, sunlight intensity, net radiation, relative humidity, and precipitation, respectively.

Table S4 Prosequencing summary 16S and ITS genes in leaf litter

| Sample Name | Bacteria     |                |       | Fungi        |                |       |
|-------------|--------------|----------------|-------|--------------|----------------|-------|
|             | Raw Tags (#) | Clean Tags (#) | Q20 % | Raw Tags (#) | Clean Tags (#) | Q20 % |
| July-1      | 79007        | 74225          | 98.35 | 87733        | 85610          | 97.87 |
| July-2      | 68173        | 61190          | 97.79 | 72892        | 72246          | 99.24 |
| July-3      | 62699        | 56182          | 97.73 | 84861        | 84355          | 99.4  |
| October-1   | 68707        | 61969          | 97.78 | 79100        | 78627          | 99.46 |
| October-2   | 64547        | 58859          | 97.96 | 81029        | 80560          | 99.47 |
| October-3   | 65456        | 59453          | 97.92 | 76378        | 75690          | 99.36 |
| February-1  | 58069        | 51792          | 97.64 | 56241        | 55811          | 99.29 |
| February-2  | 63828        | 56763          | 97.64 | 86739        | 86005          | 99.29 |
| February-3  | 65618        | 58594          | 97.77 | 87412        | 86831          | 99.39 |
| May-1       | 66679        | 59577          | 97.67 | 86022        | 85379          | 99.3  |
| May-2       | 71859        | 64956          | 97.81 | 81536        | 81099          | 99.49 |
| May-3       | 72768        | 67672          | 98.4  | 79321        | 78514          | 99.21 |



**Fig. S1** The bacterial (a) and fungal (b) relative abundance in phylum under different decay stages.