

Supplementary Table S3. Comparison of anther development stages (3 to 11) between *Arabidopsis* and *G. hirsutum*. Sizes (length and width) of the selected *G. hirsutum* floral buds corresponding to each anther developmental stage are indicated.

| Stages | Arabidopsis (Sanders <i>et al.</i> , 1999) | <i>G. hirsutum</i> | <i>G. hirsutum</i> floral bud sizes | |
|--------|---|--|-------------------------------------|-------------|
| | | | Length (mm) | Width (mm) |
| 3 | The primary parietal and sporogenous layers generate the secondary parietal layers and sporogenous cells, respectively. | The secondary parietal layers and cells are apparent. | 4.2 – 4.4 | 2.3 – 2.4 |
| 4 | Four-lobed anther pattern with two developing stomium regions generated. Vascular region initiated. | Formation of the epidermis, endothecium, middle layer and tapetum has been initiated. Vascular region appears. | 4.4 – 4.8 | 3.2 – 3.5 |
| 5 | Four defined locules established. Microspore mother cells appear. | The microspore mother cells appear. | 6.4 – 6.5 | 4.1 – 4.2 |
| 6 | Microspore mother cells enter meiosis. Middle layer is crushed and degenerates. Tapetum becomes vacuolated. | Microspore mother cells commence meiosis and the tapetal cells become vacuolated. | 7.3 – 7.6 | 4.3 – 4.5 |
| 7 | Meiosis completed. Tetrads of microspores free within each locule. Remnants of middle layer present. | The tapetal cytoplasm is condensed and tetrads appear in the anther locules. | 8.6 – 8.8 | 5.3 – 5.6 |
| 8 | Callose wall surrounding tetrads degenerates and individual microspores released. | Microspores are released from the tetrads. The tapetal cell walls have been degraded. | 9.7 – 9.9 | 6.2 – 6.4 |
| 9 | Microspores generate an exine wall and become vacuolated. | Degeneration of tapetal layer appears to commence. Microspores are vacuolated. | 10.5 – 10.6 | 6.8 – 7.1 |
| 10 | Tapetum degeneration initiates. Less vacuolated microspores exist. | The tapetum has been degraded. Remnants of tapetal cells visible. The microspores are still vacuolated. | 12.4 – 12.8 | 7.5 – 7.8 |
| 11 | Pollen mitotic divisions occur. Tapetum and septum cell degeneration initiates. Stomium differentiation begins. | Early pollen grains appear. | 17.1 – 17.5 | 10.4 – 10.8 |