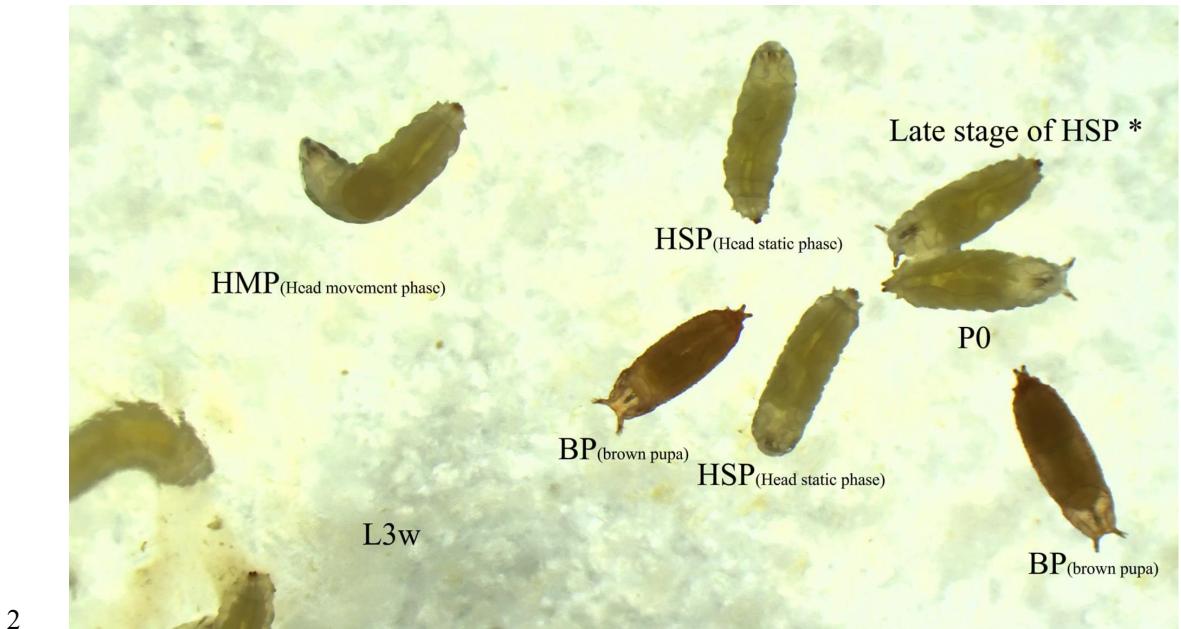


1 **Supplemental Material**



2 **Video S1. Different morphology of HMP, HSP, white pupa stage and brown pupa**

3 **stage**

4 The video simultaneously presents the morphological characteristics of fruit flies
5 at five different developmental stages. The one marked with an asterisk (*) is
6 currently in the transition period from HSP to P0. When exposed to external
7 environmental stimuli, it exhibits head peristaltic movements.
8

9



10

11 **Video S2. Outer pupal bubble formation and displacement**

12



13

14

15

Video S3. Differences between *dnrx*²⁷³ and *CS* during pupal development



16

17 **Video S4. Differences between *dnlg2*^{KO70} and CS during pupal development**

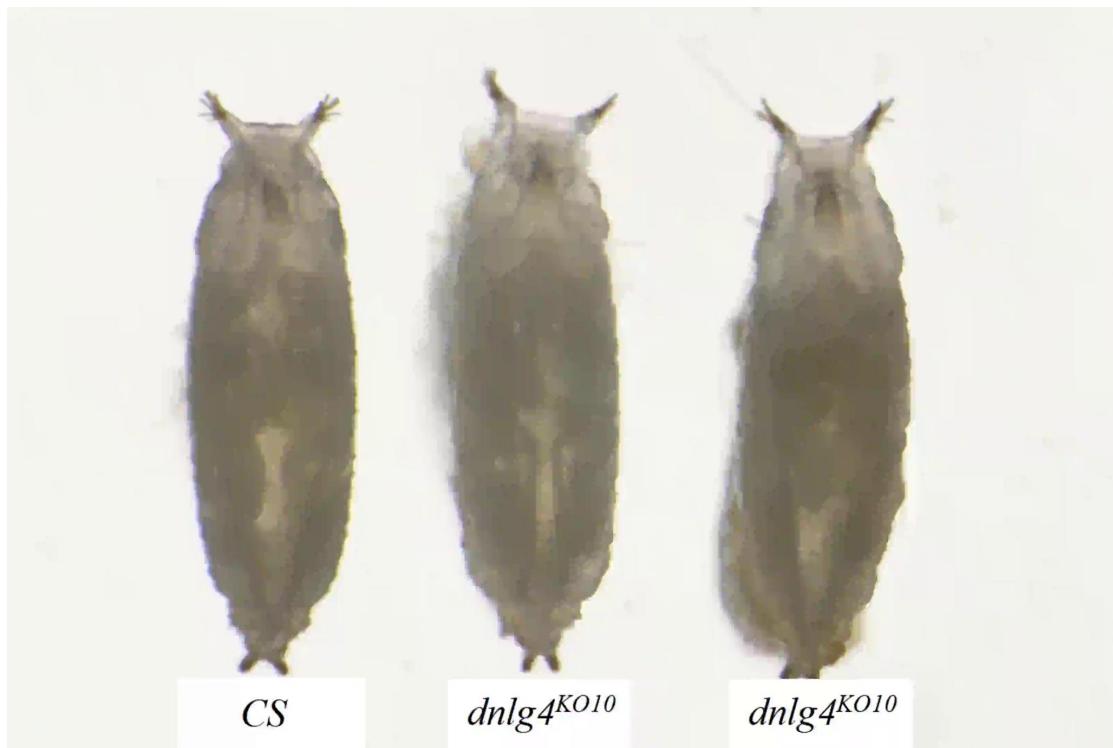
18



19

20 **Video S5. Differences between *dnlg3*^{KO127} and CS during pupal development**

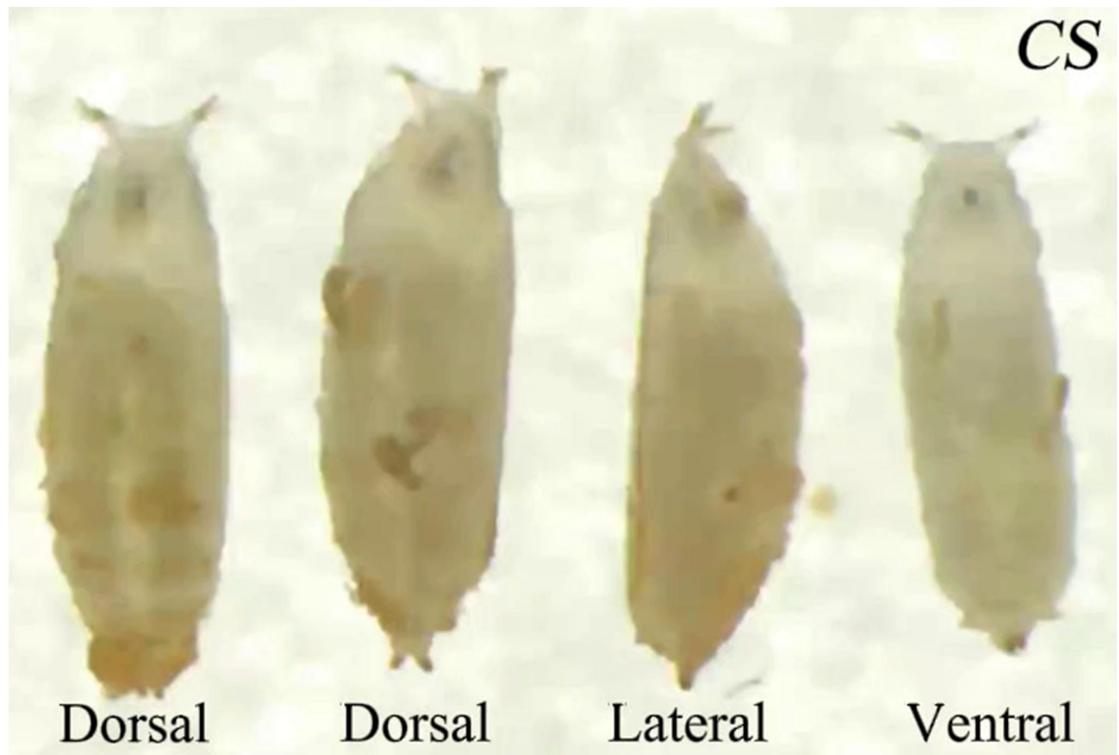
21



22

23 **Video S6. Differences between *dnlg4^{KO10}* and *CS* during pupal development**

24



25

26 **Video S7. Complete developmental process of CS pupae**

27



28

29 **Figure S1. Complete developmental process of the shape in the dorsal view of the**
30 **pupal stage of Drosophila**

31



32

33 **Figure S2. Complete developmental process of the shape in the ventral view of**
34 **the pupal stage of Drosophila**

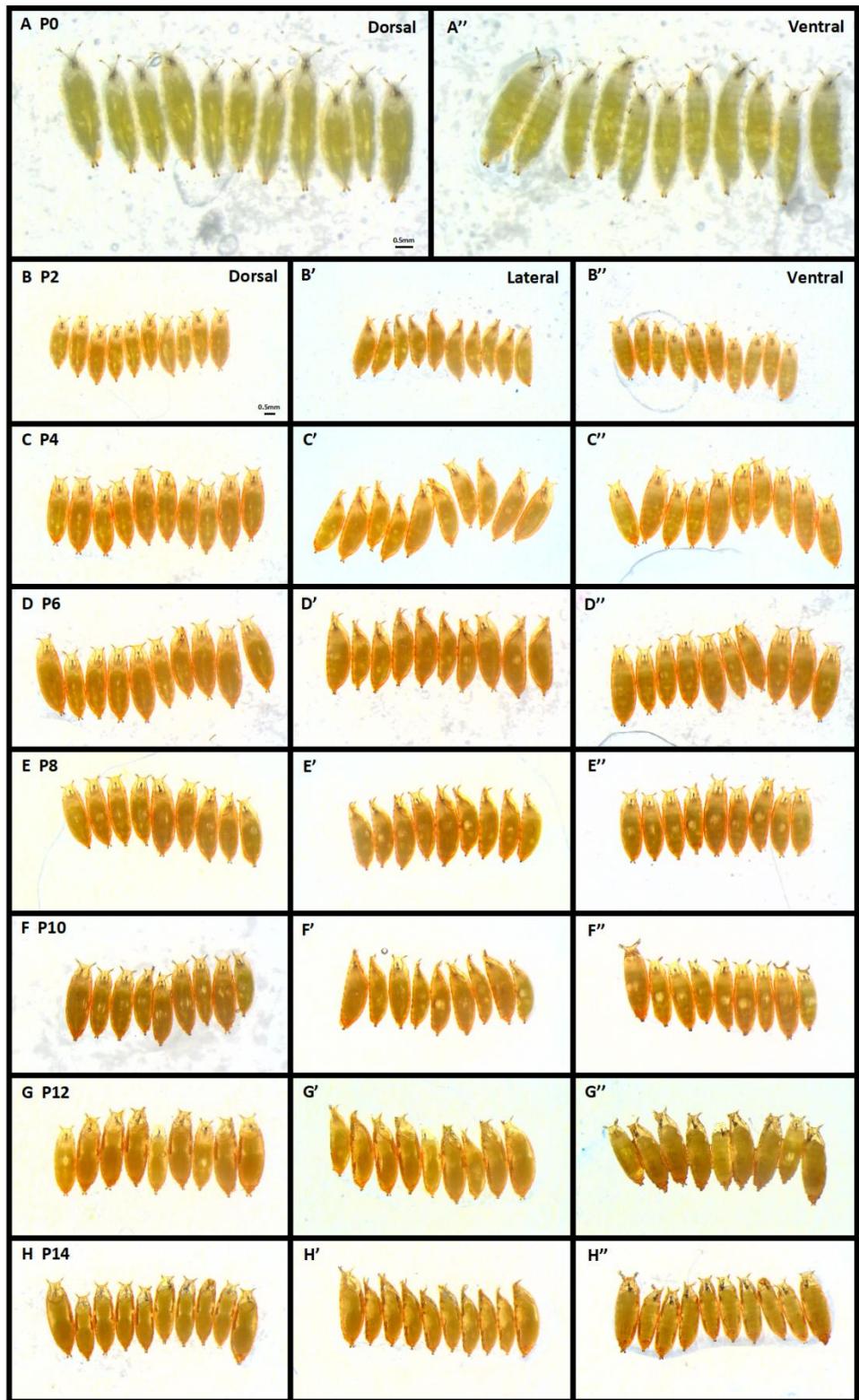
35



36

37 **Figure S3. Complete developmental process of the shape in the lateral view of the**
38 **pupal stage of *Drosophila***

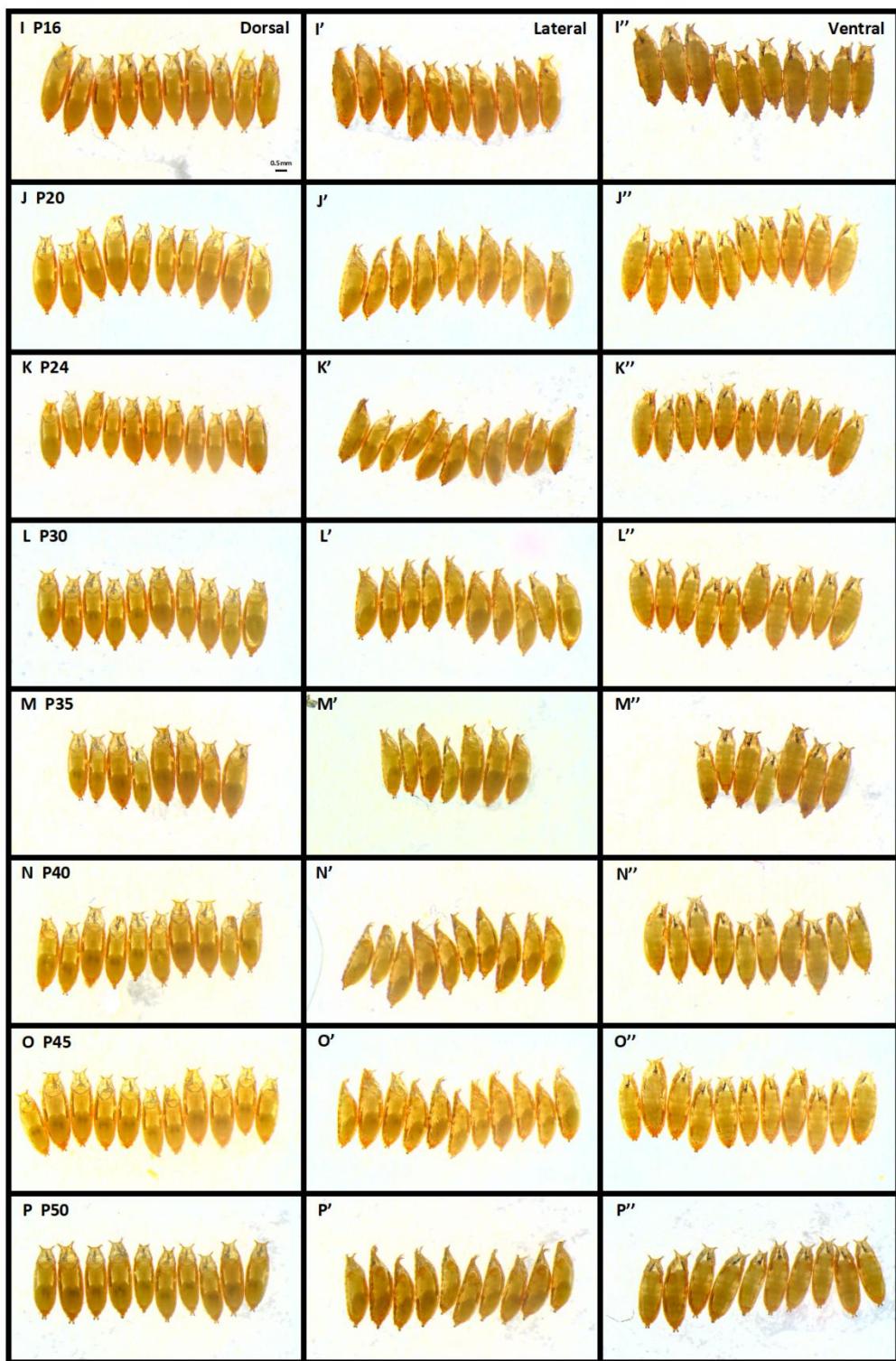
39



40

41 **Figure S4-1. Observation results of the gap sampling of the pupal stage (P0-P14)**

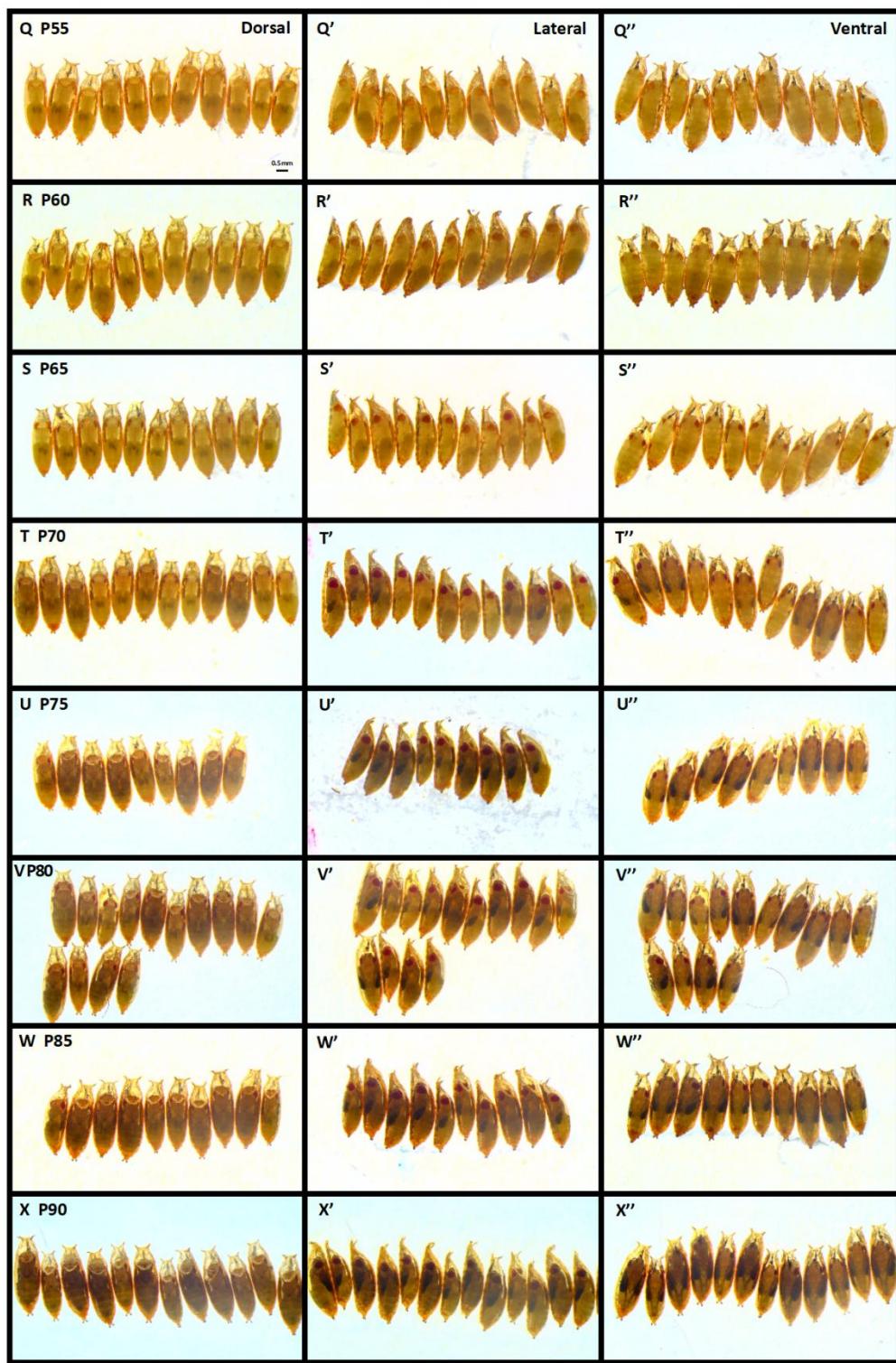
42



43

44 **Figure S4-2. Observation results of the gap sampling of the pupal stage**
 45 **(P16-P50)**

46

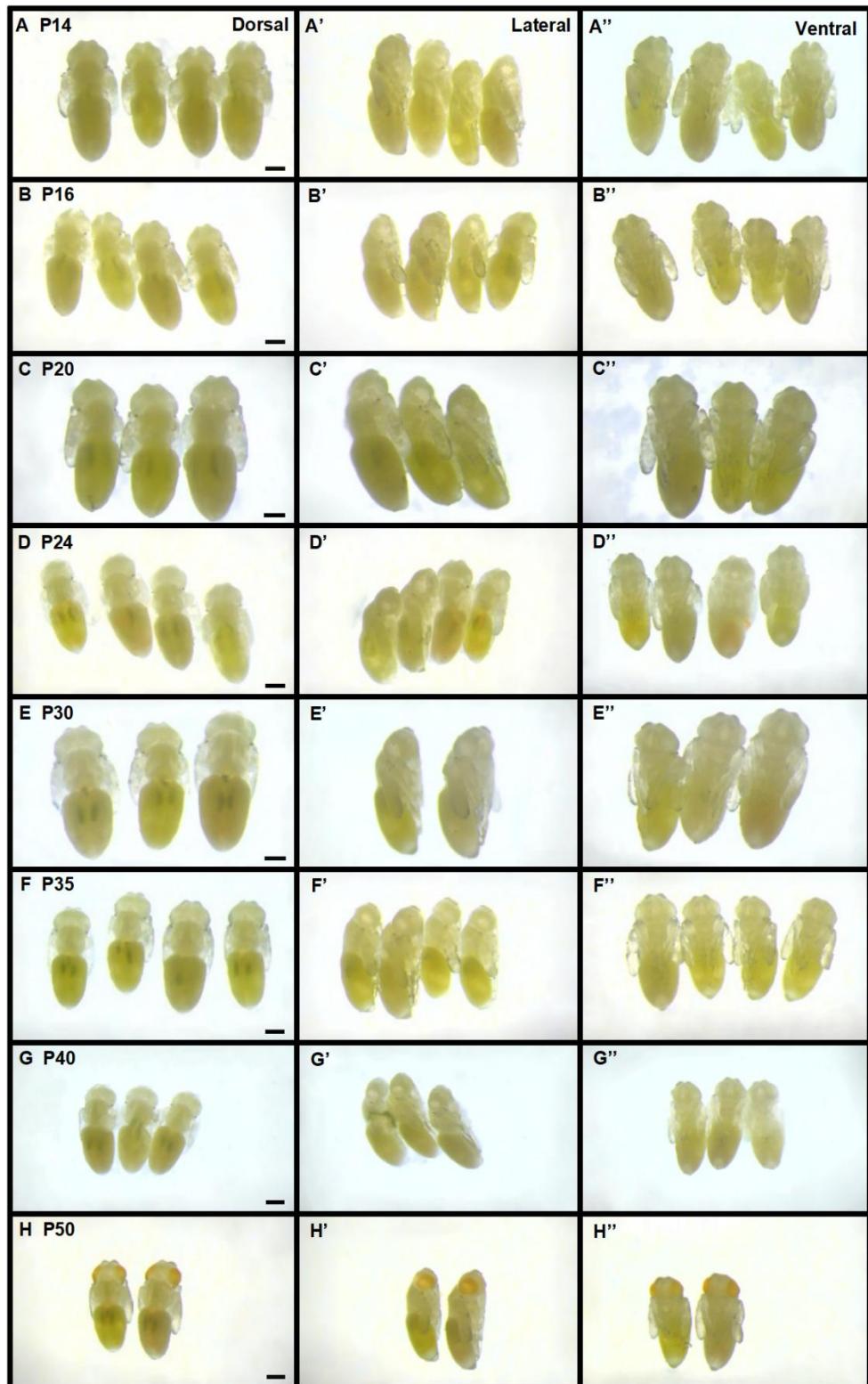


47

48 **Figure S4-3. Observation results of the gap sampling of the pupal stage**

49 **(P55-P90)**

50

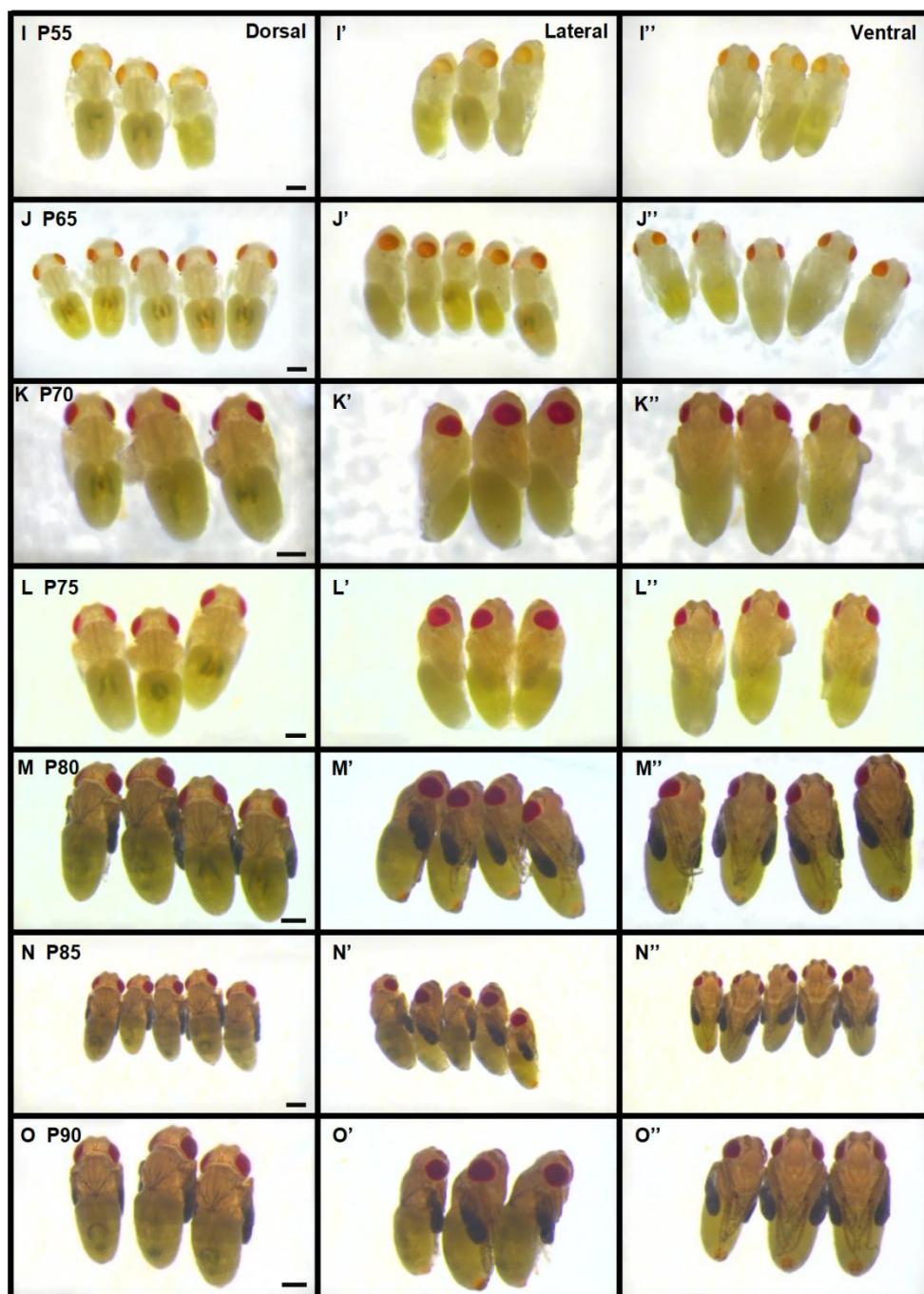


51

52 **Figure S5-1. Post-removal morphology of the pupal stage (puparium removed)**

53 **(P14-P50)**

54



55

56 **Figure S5-2. Post-removal morphology of the pupal stage (puparium removed)**

57 **(P55-P90)**