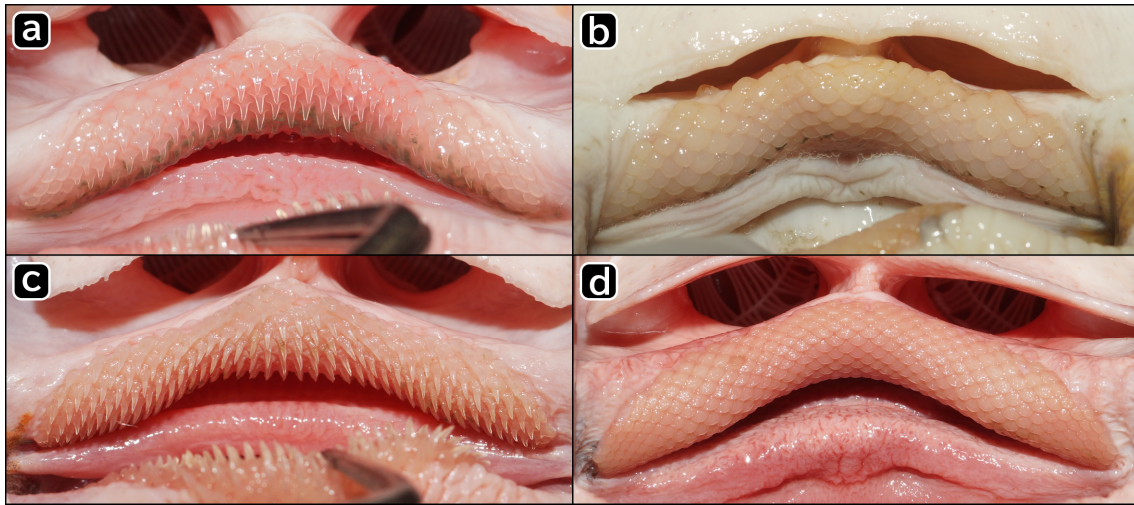
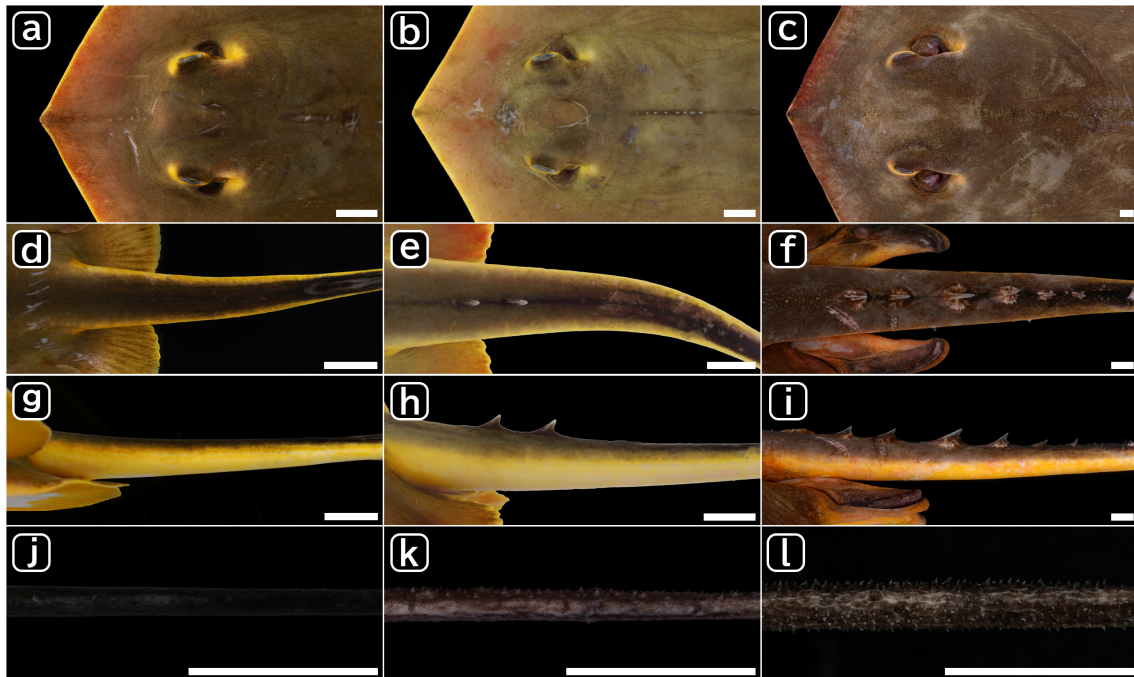
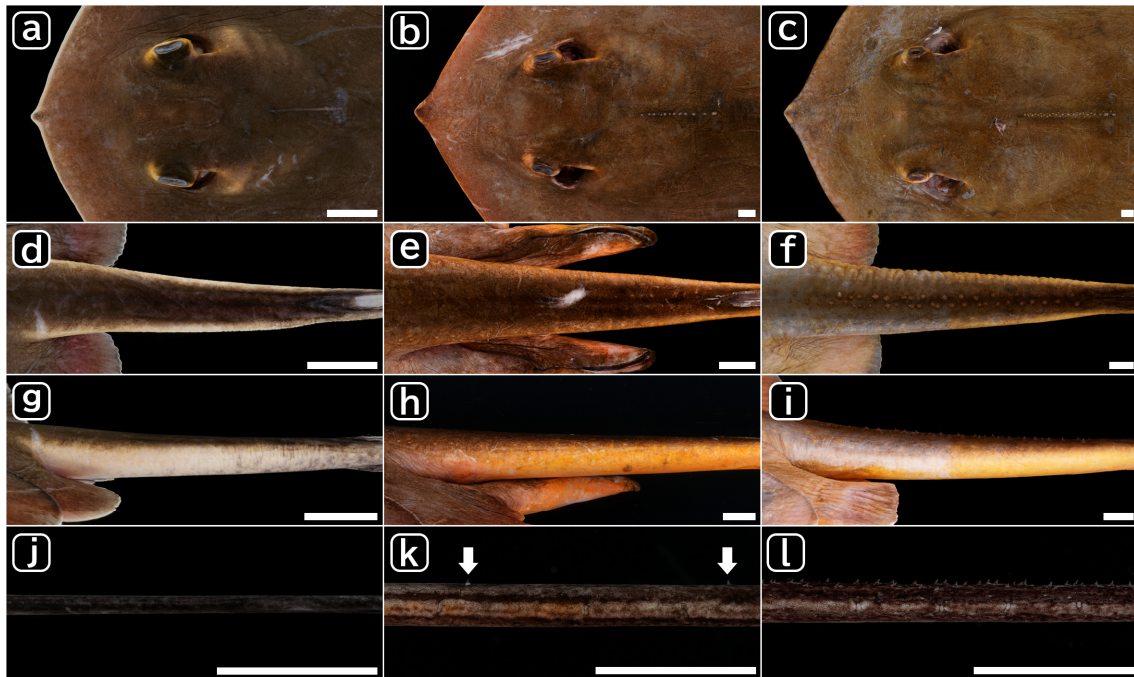




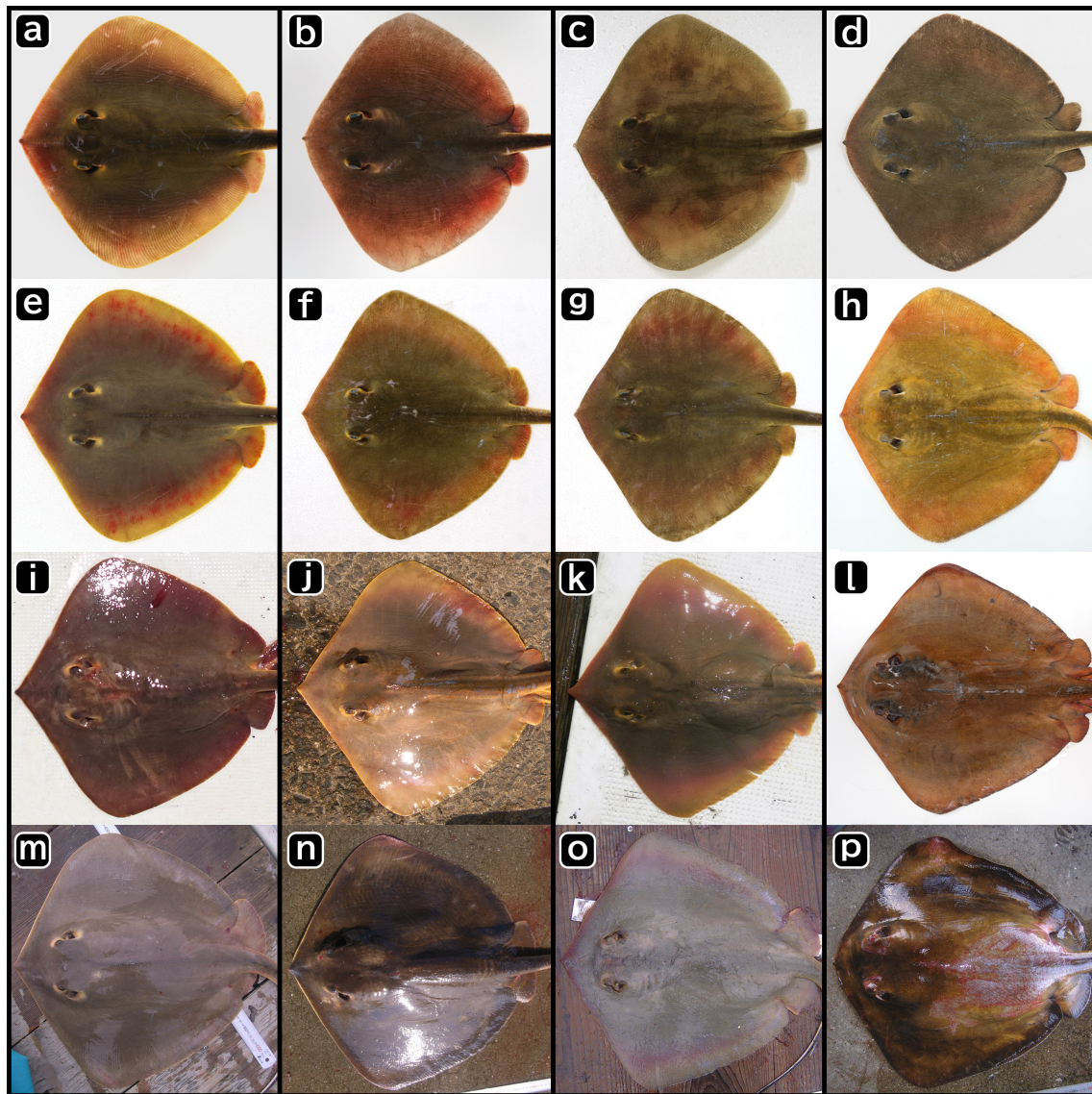
ESM Fig. S1 Photographs showing the upper teeth. **a, b** *Hemitrygon akajei* (**a** FFNU-P-02136, 342.3 mm DW, male, mature; **b** FFNU-P-02177, 593.3 mm DW, female, mature); **c, d** *Hemitrygon ariakensis* sp. nov. (**c** holotype, FFNU-P-02129, 363.3 mm DW, male, mature; **d** FFNU-P-02140, 571.2 mm DW, female, mature)



ESM Fig. S2 Close-up photographs showing changes in the development of thorns and denticles in *Hemitrygon akajei* at different growth stages. **a–c** Snout to scapular region; **d–f** dorsal and **g–i** lateral views of tail anterior to caudal spine region; **j–l** lateral view of denticles on posterior part of tail. **a, d, g**: FFNU-P-02178, 156.5 mm DW, male; **b**: FFNU-P-02166, 187 mm DW, female; **c, i**: FFNU-P-02130, 478.4 mm DW, female; **e, h**: FFNU-P-02168, 198 mm DW, male; **f, i**: FFNU-P-02142, 453.4 mm DW, male; **j**: FFNU-P-02143, 139.7 mm DW, female; **k**: FFNU-P-02134, 327.1 mm DW, female. Scales indicate 10 mm



ESM Fig. S3 Close-up photographs showing changes in the development of thorns and denticles in *Hemitrygon ariakensis* sp. nov. at different growth stages. **a–c** Snout to scapular region; **d–f** dorsal and **g–i** lateral views of tail anterior to caudal spine region; **j–l** lateral view of denticles on posterior part of tail. **a, d, g**: FFNU-P-02128, 137.1 mm DW, male, immature; **b, e, h, k**: holotype, FFNU-P-02129, 363.3 mm DW, male, mature; **c**: FFNU-P-02140, 571.2 mm DW, female, mature; **f, i, l**: FFNU-P-02122, 457.7 mm DW, female, mature?; **j**: FFNU-P-02126, 154.4 mm DW, male, immature. Arrows indicate denticles. Scales indicate 10 mm



EMS Fig. S4 Comparison of growth stages among four species of genus *Hemitrygon* in Japan. **a, e, i, m** *Hemitrygon akajei* (**a** FFNU-P-02143, 139.7 mm DW, female; **e** FFNU-P-02168, 198 mm DW, male; **i** non-specimen, 340 mm DW, male; **m** non-specimen, 533 mm DW, female); **b, f, j, n** *H. ariakensis* sp. nov. (**b** FFNU-P-02128, 137.5 mm DW, male; **f** FFNU-P-02194, 206 mm DW, female; **j** non-specimen, 330 mm DW, male; **n** non-specimen, 656 mm DW, female); **c, g, k, o** *H. laevigata* (**c** FFNU-P-02231, 116 mm DW, female; **g** FFNU-P-02232, 184 mm DW, male; **k** non-specimen, 250 mm DW, male; **o** non-specimen, 353 mm DW, female); **d, h, l, p** *H. izuensis* (**d** FFNU-P-02226, 150.9 mm DW, male; **h** FFNU-P-02222, 322.0 mm DW, male; **l** non-specimen, 510 mm DW, male; **p** non-specimen, 646 mm DW, female). **a–d** neonates, **e–h** immatures, **i–l** mature males, **m–p** mature females