# Supplementary Materials: Genome-Wide Mapping of Growth-Related Quantitative Trait Loci in Orange-Spotted Grouper (*Epinephelus coioides*) Using Double Digest Restriction Site Associated DNA Sequencing (ddRADseq)

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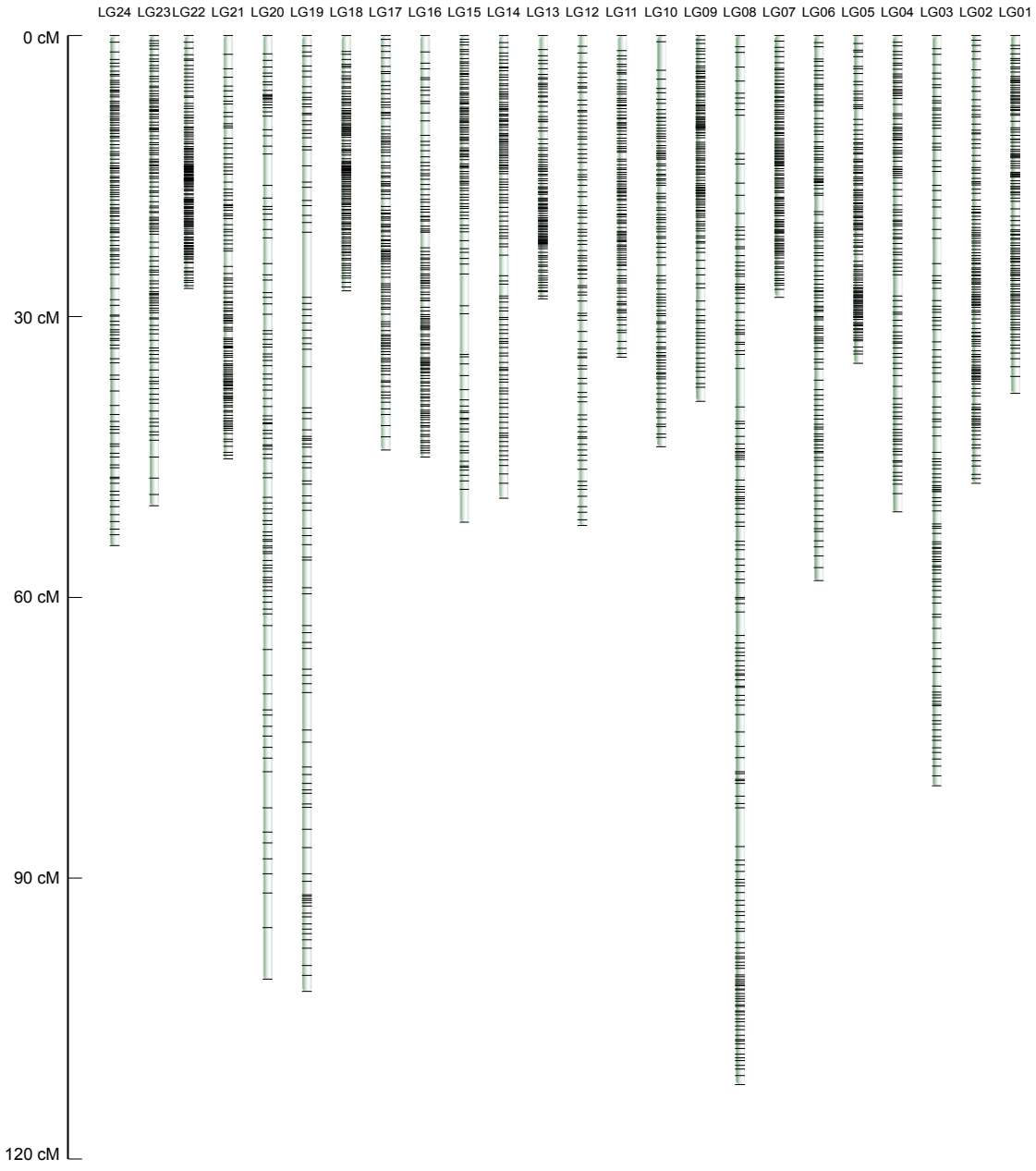


**Figure S1.** The distribution of SNPs (single-nucleotide polymorphisms) on the 24 linkage groups (LGs).

**Table S2.** The genetic linkage map of orange-spotted grouper.

| Chromosome | Marker Number | Distance (cM) |
|---|---|---|
| LG1 | 131 | 38.003 |
| LG2 | 142 | 47.544 |
| LG3 | 128 | 79.725 |
| LG4 | 117 | 50.623 |
| LG5 | 130 | 34.838 |
| LG6 | 127 | 57.911 |
| LG7 | 121 | 27.802 |
| LG8 | 169 | 111.465 |
| LG9 | 133 | 38.86 |
| LG10 | 103 | 43.686 |
| LG11 | 116 | 34.196 |
| LG12 | 94 | 52.042 |
| LG13 | 115 | 26.459 |
| LG14 | 131 | 48.457 |
| LG15 | 123 | 51.329 |
| LG16 | 132 | 43.051 |
| LG17 | 127 | 44.031 |
| LG18 | 133 | 25.432 |
| LG19 | 103 | 101.569 |
| LG20 | 115 | 100.273 |
| LG21 | 129 | 44.994 |
| LG22 | 150 | 25.537 |
| LG23 | 130 | 49.952 |
| LG24 | 130 | 54.199 |
| Average | 126 | 51.199 |
| Total | 3029 | 1231.978 |

**Table S4.** The putative roles of 14 genes.

| Gene Symbol | Gene Description | Gene ID | Putative Role | Reference |
|---|---|---|---|---|
| *wdrcp91* | WD repeat-containing protein 91-like | Eco_gene_10005999 | unreported | – |
| *prrc2b* | proline-rich coiled-coil 2B | Eco_gene_10005555 | unknown | [44] |
| *FEZ2* | fasciculation and elongation protein zeta-2-like | Eco_gene_10012941 | related genes to age in humans | [45] |
| *alg3* | Dol-P-Man:Man(5)GlcNAc(2)-PP-Dol$\alpha$-1,3-mannosyltransferase | Eco_gene_10013595 | related genes to growth, protein secretion, pigment production and sporulation in *Aspergillus niger* | [46] |
| *ECE2* | endothelin converting enzyme 2 | Eco_gene_10013597 | related genes to the generation of novel neuropeptides, Alzheimer's disease, the development of murine cardiac | [47–49] |
| *ARVCF* | armadillo repeat gene deleted in velocardiofacial syndrome | Eco_gene_10014238 | related genes to neurodevelopment | [50] |
| *SLC27A4* | solute carrier family 27 (fatty acid transporter), member 4 | Eco_gene_10004531 | related to the lean percentage and loin eye area of pig | [51] |
| *SGK223* | tyrosine-protein kinase SgK223 | Eco_gene_10005552 | related to the signaling pathway of pancreatic ductal adenocarcinoma (PDAC) progression in humans | [52] |
| *CAMK2* | calcium/calmodulin-dependent protein kinase 2 | Eco_gene_10002069 | related to mitochondrial adenosine triphosphate (ATP) synthesis activity | [53] |
| *MCHR1* | melanin-concentrating hormone receptor 1 | Eco_gene_10000893 | related to the control of feeding, stress and mood | [54,55] |
| *SARDH* | sarcosine dehydrogenase | Eco_gene_10005043 | related to one-carbon metabolism and cellular invasion | [56] |
| *PAPP-A* | pregnancy-associated plasma protein-A | Eco_gene_10018102 | related to dissolving fat, gestational diabetes mellitus, obstetric cholestasis | [57–59] |
| *SYK* | spleen tyrosine kinase | Eco_gene_10014809 | related to proximal immunoreceptor signaling, keratinocyte terminal differentiation, the survival and migration of multiple myeloma cells | [60,61] |
| *MATE1* | multidrug and toxin extrusion protein 1-like | Eco_gene_10021611 | related to flutamide pharmacokinetics of the peripheral blood cell in the process of the liver injury development | [62] |

**Table S6.** Pearson correlation coefficients for body weight and body length.

| Growth-Related Traits | No. of Progeny | Body Weight (g) | Body Length (cm) |
|---|---|---|---|
| Body Weight (g) | 68 | 1 | 0.969 ** |
| Body Length (cm) | 68 | 0.969 ** | 1 |

**: Significant correlation at 0.01 level (two-tailed).

**Table S7.** The components of 30 μL double-digestion reaction system.

| Reagent | Volume (μL) |
|---|---|
| DNA template | 20 |
| Taq I * | 1 |
| 10X Taq I buffer | 3 |
| Msp I ** | 1 |
| 10X Msp I buffer | 3 |
| Nuclease-free water | 1 |

*: 15 U/μL, restriction enzyme cleavage site 5′ TˆCGA 3′ (Thermo Scientific, Waltham, MA, USA);
**: 15 U/μL, restriction enzyme cleavage site 5′ CˆCGG 3′ (Thermo Scientific, Waltham, MA, USA).

**Table S8.** The components of 40 μL ligation reaction system.

| Reagent | Volume (μL) |
|---|---|
| enzyme-digested products | 30 |
| unique adapter | 1 |
| 10X Taq I buffer | 1 |
| 10X Msp I buffer | 1 |
| T4 DNA ligase | 2 |
| dNTP | 0.4 |
| $ddH_2O$ | 4.6 |