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A Comparison of Commercial Characteristics and Yield Partitioning Between *Macrobrachium rosenbergii* (De Man 1879) and *Macrobrachium malcolmsonii* (Milne Edward 1894)

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Abstract: *Macrobrachium rosenbergii* and *Macrobrachium malcolmsonii* are two important freshwater prawn species having commercial importance. Both the species command same price in export market. A comparison of yield traits between two species has been studied to get insight into carcass and commercial traits. In both species, head percentage showed an increasing trend while the tail percentage showed a decreasing trend, with increase in body weight. *M. rosenbergii* had a higher overall head percentage compared to that of *M. malcolmsonii*. Peeled data on *M. rosenbergii* indicated a higher tail flesh percentage on tail weight basis. Same trend was observed when data was analyzed on body weight basis. In general, tail meat yields for *M. rosenbergii* were significantly ($P \leq 0.05$) higher than those of *M. macolmsonii*. Tail scale percentage on tail weight basis was higher in *M. rosenbergii* in comparison to *M. malcolmsonii.* As the body weight increased the tail scale percentage decreased in *M. rosenbergii* however it is reverse in *M. malcolmsonii*. *M. rosenbergii* has thick tail shell in comparison to *M. malcolmsonii*.

Key words: *Macrobrachium rosenbergii* · *Macrobrachium malcolmsonii* · Carcass Traits · Partitioning Traits

INTRODUCTION

Macrobrachium rosenbergii, also known as "scampi" is a species of aquaculture importance owing to high fecundity, rapid growth, wide range of salinity, temperature tolerance and disease resistance as well as in superior taste and high commercial value. This species is the largest known palaemonid in the world [1]. Commercial fishery for the monsoon river prawn *Macrobrachium malcolmsonii* is reported to occur in India, Pakistan, Myanmar, Bangladesh and Srilanka [2].

Both domestic and international market exists for freshwater prawn and is gradually expanding. Peeled *M. rosenbergii* are long been exported globally. Farmed shell-on and head-on freshwater prawn are also a familiar sight in the super markets. Head-on and shell-on products are served in restaurants of Asian origin; Japan and U.S.A. Freshwater prawns are a distinct product from marine shrimps, which have its own favorable culinary characteristics. Both *M. rosenbergii* and *M. malcolmsonii* command same price in export market [3]. Knowledge about proper preparation of this species before consumption is thought to be very important to generate a good consumer image of the product [4]. Babu and Naik [5] reported processing yield of *M. rosenbergii* has headless shell-on yield 37-50% and peeled deveined yield 30.6-43.5% in different market classes.

The processing yield of freshwater prawn product varies considerably with claw type and sex. The most disadvantageous features in freshwater prawn marketing are low tail yield, which ranges from 28-51% only. Apparently the proportion of tail yield decreases with increasing prawn size. The marketing of these species involves both whole animals and tails (both whole tail and peeled deveined) for local market and export trade. Smith *et al*. [6] provided a table and nomograph to serve as guideline in determining the approximate tail weight or count size for *M. rosenbergii* of a variety of sizes. Wilkins [7] suggested that mass selection is appropriate methods to improve tail weight in grow out. He revealed some basic information on the level and organization of genetic variation in *M. rosenbergii*.

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Doyle, *et al.* [8] estimated the significant difference associated with sex, stage of male maturity, weight class for body size traits and dress out percentage and correlation among the traits. Results showed a significant variation for traits of economic importance. Large phenotypic variation allows development of large selection differentials in selection programs.

Use of simple length-weight relationship is unsatisfactory to calculate the mean weight of a prawn group. Therefore, the length-weight data along with carcass yield traits may provide an accurate relationship and allometry [9]. A comparison of yield traits between two species has been studied to get insight into carcass and commercial traits.

MATERIALS AND METHODS

Giant freshwater prawn (*M. rosenbergii*) and riverine prawn (*M. malcolmsonii*) are cultured in laterite stone lined ponds in Central Institute of Freshwater Aquaculture, Bhubaneswar for eight months under isonitrogenous and isocaloric feed (CIFAPRA) and prawns were harvested by dewatering. Prawn samples collected ranged between 10-70g, were grouped into seven weight groups with an increment of 10g. Prawns are iced immediately after harvest and brought to the laboratory for dressing and carcass yield characterization. Head, tail and carcass components were weighed to nearest 0.1g for their relationship with body weight classes in each species [10].

RESULTS AND DISCUSSION

Commercial characteristics and yield partitioning in seven body weight classes in *M. rosenbergii* and *M. malcolmsonii* are presented in Table 1.

In both species head percentage showed an increasing trend and the tail percentage a decreasing trend with the increase in body weight. Head yield in *M. rosenbergii* was significantly ($P \leq 0.05$) higher than

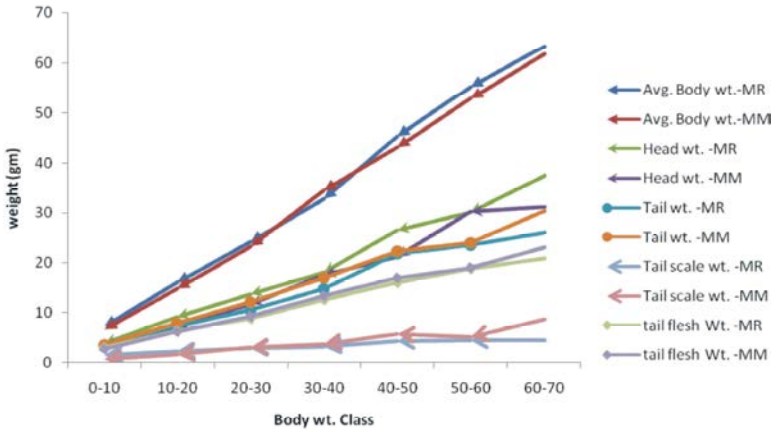

Fig. 1: A comparison of carcass yield traits between *Macrobrachium rosenbergii* (MR) and *Macrobrachium malcolmsonii* (MM)

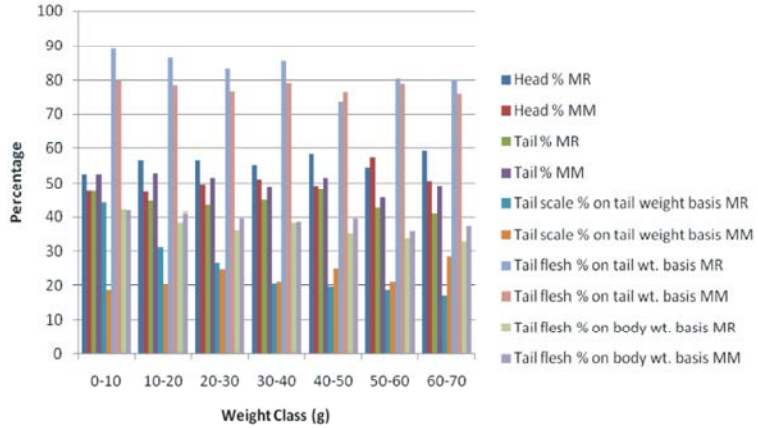

Fig. 2: A comparison of carcass partitioning traits between *Macrobrachium rosenbergii* (MR) and *Macrobrachium malcolmsonii* (MM)

Table 1: Comparison of commercial characteristics and yield partitioning in seven body weight classes in *M. rosenbergii* (MR) and *M. malcolmsonii* (MM), Mean ± SD, n=20

Species	Body wt. class range (g)	Body weight average (g)	Head wt. (g)	Head %	Tail wt. (g)	Tail %	Tail scale wt. (g)	Tail scale % on tail weight basis	Tail flesh wt. (g)	Tail flesh % on tail wt. basis	Tail flesh % on body wt. basis
MR	1-10	7.26±1.8	3.81±0.6	52.50^a	3.45±0.9	47.49^a	1.52±0.6	24.01^a	3.07±1.2	89.07^a	42.28^a
MM		6.59±2.5	3.13±1.2	47.40^b	3.46±1.1	52.53^b	0.65±0.2	18.64^b	2.77±1.3	80.03^b	42.03^a
MR	10-20	16.09±2.2	9.09±0.9	56.49^a	7.17±1.1	44.55^a	2.24±0.8	31.28^a	6.18±1.5	86.27^a	38.40^a
MM		14.70±2.31	6.95±1.6	47.29^b	7.75±1.5	52.72^b	1.56±0.3	20.12^b	6.07±1.6	78.36^b	41.29^b
MR	20-30	24.24±3.2	13.69±1.1	56.50^a	10.53±1.1	43.43^a	2.81±1.0	26.73^a	8.76±1.6	83.25^a	36.14^a
MM		23.27±1.8	11.54±1.9	49.58^b	11.99±2.0	51.55^b	2.96±0.5	24.68^b	9.22±1.3	76.83^b	39.82^b
MR	30-40	32.76±2.7	18.03±1.8	55.05^a	14.72±1.3	44.95^a	3.05±1.3	20.73^a	12.57±1.8	85.37^a	33.37^a
MM		34.48±2.3	17.59±3.8	51.02^b	16.88±3.5	48.96^b	3.58±1.0	21.19^b	13.34±1.1	79.05^b	38.69^b
MR	40-50	45.39±2.6	26.42±2.0	58.19^a	21.73±1.6	47.86^a	4.27±1.1	19.64^a	15.97±2.4	73.51^a	35.18^a
MM		43.14±2.9	21.20±3.2	49.14^b	22.27±3.1	51.63^b	5.55±1.1	24.92^b	17.03±2.8	76.87^b	39.47^b
MR	50-60	55.28±3.2	30.03±1.6	54.32^a	23.54±1.2	42.58^a	4.39±1.2	18.65^a	18.72±2.2	80.31^a	33.36^a
MM		52.83±2.9	30.26±3.1	57.27^b	24.01±2.9	45.46^b	5.06±1.3	21.09^b	18.95±2.9	76.93^b	35.87^b
MR	60-70	63.50±3.6	37.55±3.2	59.13^a	26.09±3.8	41.09^a	4.45±1.5	17.06^a	20.90±2.5	80.12^a	32.91^a
MM		61.88±3.4	31.25±3.5	50.50^b	30.48±3.2	49.25^b	8.67±0.9	28.44^b	23.15±3.1	75.97^b	37.41^b
MR	0-70 (pooled)	34.93	19.95	56.03^a	15.32	44.56^a	3.25	25.44^a	12.31	82.56^a	36.73^a
MM		33.84	17.42	50.32^b	16.69	50.30^b	4.0	22.72^b	12.94	75.97^b	39.18^b

Values with different superscripts in a column and for each body weight class differ significantly ($p \leq 0.05$)

M. malcolmsonii. Carcass yield traits of *M. rosenbergii* and *M. malcolmsonii* are presented in Figure 1 and Figure 2.

M. rosenbergii had a higher overall head percentage compared to that of *M. malcolmsonii*. Average tail yield of *M. malcolmsonii* was 50.3% in comparison to 44.5% in *M. rosenbergii*. Babu and Naik [5] reported processing yield of *M. rosenbergii* has headless shell-on yield 37-50% and peeled deveined yield of 30.6-43.5% in different market classes. Peeled data on *M. rosenbergii* indicated a higher tail flesh percentage on tail weight basis (82.50 vs. 75.97) than *M. malcolmsonii*. However it was reverse for *M. rosenbergii* (36.73 vs. 39.18) when calculated on body weight basis. In general tail meat yields for *M. rosenbergii* are significantly ($P<0.05$) more than those obtained from *M. malcolmsonii*.

Tail scale percentage on tail weight basis was significantly ($P<0.05$) higher in *M. rosenbergii* in comparison to *M. malcolmsonii* however, the species had higher tail meat yield when compared both tail weight basis and body weight basis. As the body weight increased the tail scale percentage decreased in *M. rosenbergii* however it is reverse in *M. malcolmsonii*.

Smith *et al*. [6] provided a table and nomograph to serve as guide in determining the approximate tail weight or count size for *M. rosenbergii* of a variety of sizes. In general meat yields for *M. rosenbergii* are more than those obtained from *M. malcolmsonii*. The marketing of these species involves both whole animals size and tail yield. Processing yield for pond reared Malaysian prawns *M. rosenbergii* were size and sex dependent. The percentage of tail weight yield decreases with increased prawn size.

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