

Breeding of Two New Silkworm Varieties with Peculiar Laval Mark, “Eolrukmal” and “Hukpyobeom”

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The Eolrukmal and Hukpyobeom varieties were bred for special purpose such as experience and education. The Eolrukmal variety was selected and succeeded from the F₁ of Huka × Galwon in 2004 summer. It has stripes and brown half-moon body marks. The Hukpyobeom variety was selected and succeeded from the F₁ of Remone × Hukho in 2004 summer. It has black body color and bright yellow segments. They are healthy yellow cocoon spinning varieties showing over 93% of high practical hatching ratio and 93.1% of emergence ratio. The Eolrukmal moth laid 450 egg/batch and the Hukpyobeom moth laid 440 egg/batch.

Key words: Silkworm, Breeding, Laval mark, Silkworm genetic resource

Introduction

The silkworm (*Bombyx mori* L.) is an industrial insect with characteristics of heteromorphism belonging to an insect order Lepidoptera (family Bombycidae). The Korean sericulture has been well adapted for the sericulture farms by supplying many kinds of silkworm varieties from the beginning of sericultural research in 1900 (Lee *et al.*, 1985). The sericultural industry has once greatly contributed to the national economy as one of the major industries in Korea, but has been declined by the change of agricultural circumstances such as shortage of manpower in the rural area. Now there is a new chance of seri-

cultural revival by the development of silkworm powder and male pupa for some pharmaceutical materials.

The RDA maintains 335 silkworm varieties (Sohn *et al.*, 2001) and these silkworm genetic resources are registered as national property. The demand for these silkworm varieties for exhibition and educational experience has greatly been increased and this demand has forced to develop the silkworm varieties with peculiar larval marks that may attract general lovers. There are many silkworm varieties that have peculiar striped, spotted and dark marks, but they have some limitation for the perspective of genetics stocks such as small cocoon size, unhealthy and inferior characteristics of oviposition (Harada, 1961). Now we have succeeded in breeding of silkworm varieties with peculiar larval marks by improving the above problems.

Materials and Methods

The Eolrukmal variety has striped larval markings like zebra and spins yellow cocoons. This variety was bred in the summer of 2004 by crossing Huka and Galwon and the individuals with striped and brown crescent markings were selected during the first generation.

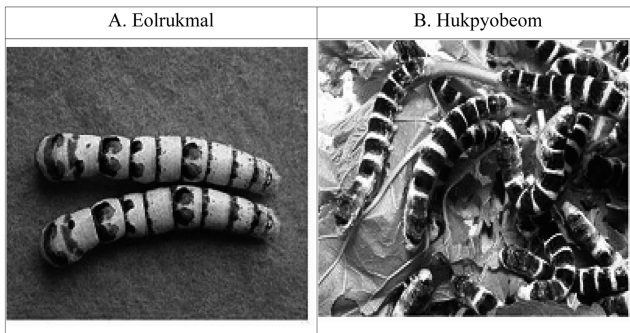
The Hukpyobum variety has black body color except its segment and it spins yellow cocoons. This was also bred in summer, 2004 by crossing Remone and Hukho and the individuals with black body and bright yellow segment were selected in the first generation.

From 2004 these two varieties were succeeded for 12 generations in Department of Agricultural Biology and they were designated as specific larval marking varieties at the Leading Silkworm Variety Committee in 2008 and the Eolrukmal variety was named as silkworm Jam313 and the Hukpyobeom variety as Silkworm Jam314.

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Table 1. Rearing results of two varieties in summer 2008

Variety	Useful hatchability	Larval period		Laval marking	Cocoon color	Pupation percentage	Cocoon yield per 10,000 3rd molted larvae
		5th instar	Total instar				
	%	days.hrs		%	%	%	kg
Eolrukmal	93	6.01	22.22	zebra	yellow	93.1	12.4
Hukpyoboem	95	5.06	20.03	black	yellow	95.0	11.8

**Fig. 1.** Pictures of Eolrukmal (A) and Hukpyobeom (B).

Results and Discussion

Result of silkworm rearing of the two varieties

Table 1 shows the rearing results of the two varieties obtained in summer, 2008. The hatching percentage in two consecutive days of Eolrukmal was 93% and the total larval period was 22 days and 22 hrs, indicating the variety is shorter than those of normal silkworm varieties. It showed 93.1% of pupation percentage, which is the index of the healthiness and resistance of silkworm variety. The number of cocoons per 1 liter was 109, meaning that cocoons are smaller than normal cocoons, and the single cocoon weight was 1.61 g with 12.4 kg of cocoon yields out of 10,000 3rd molted larvae. The silkworm has striped pattern with brown crescent larval markings (Fig. 1) and spin yellow cocoons. As the larval growth was healthy the rearing management was easy. Average number of eggs per batch was 440.

The Hukpyobeom variety showed high hatching percentage of 95% in two consecutive days and has shorter fifth instar period at 5 days and 6 hrs, and the whole larval period was 4 days shorter than normal silkworm. This variety showed a high healthiness with 95% of pupation percentage but showed relatively lighter single cocoon weight of 1.25 g. The cocoon yields from 10,000 3rd molted larvae were 11.8 kg and it was a half of commercial varieties. Hukpyobeom has black body and bright yellow segment (Fig. 1), and spins yellow cocoon. It shows

Table 2. Adaptability test to the artificial diet of silkworm in spring, 2009

Variety	Bristling percentage	Larval period from 1st to 3rd	Molting percentage			Adaptability
			2nd	3rd	4th	
	%	days.hrs	%	%	%	
Baegokjam	96	12.09	99	96	96	Excellent
Eolrukmal	36	12.09	75	90	90	-
Hukpyoboem	70	12.09	85	93	90	-

uniform and healthy growth, and has a short 5th instar period. The number of eggs per batch was 450. The healthy and uniform growth with short larval period of these two varieties makes the silkworm rearing easier.

Result of artificial diet adaptability test

Table 2 shows the result of adaptability test to the artificial diet of silkworms obtained in spring, 2009. As indicated, the adaptability to artificial diet of the two newly developed varieties was lower than the control variety Baegokjam (Lee *et al.*, 1984), which has well been adapted to artificial diet.

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