

Breeding and Diversified Utilization Research on Polyploid Hybrid Mulberry Varieties

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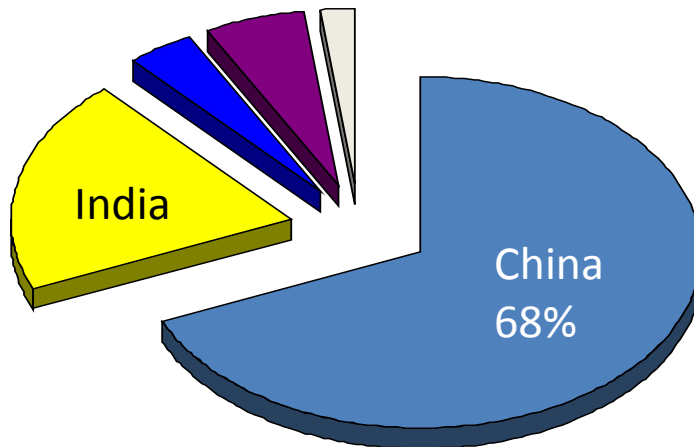
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Silk Road Economic Belt and 21st-Century Maritime Silk Road

◆ In the world, China is a country with the largest area of mulberry field and the highest output of fresh cocoon and raw silk.



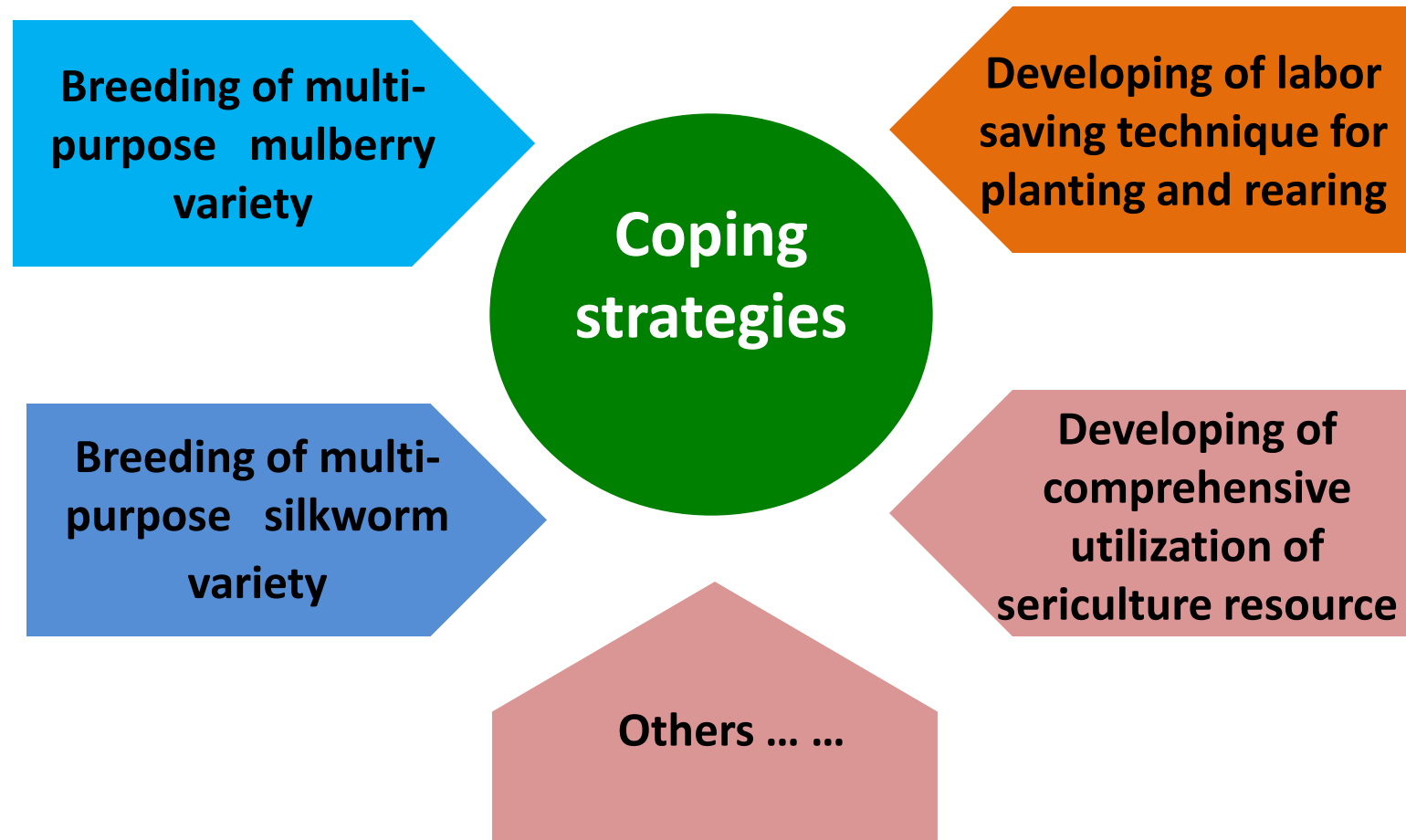
Raw Silk
Production

The challenges of China sericulture



- ◆ **The development of urbanization**
- ◆ **Lack of rural labor (silkworm rearing labor)**
- ◆ **Decline of Comparative economic benefits**
- ◆ **Climate changes and chemicals, etc.**

How to Match the Need of Sericulture?





Silkworm rearing

Mulberry

Diversified utilization

Research Focus

- ◆ **Breeding multi-purpose polyploid mulberry varieties**
- ◆ **Developing diversified utilization of polyploid mulberry varieties**

**Gerpmlasm
collection**

**Germplasm
evaluation**

**Polyploid
creation**

**Breeding
objective**

**Parents
selection**

**Polyploid
variety**

**Crossing
technique
& method**



Polyploid germplasm resources induced by colchicine



Young seedlings are treated by colchicine for 3-5d.

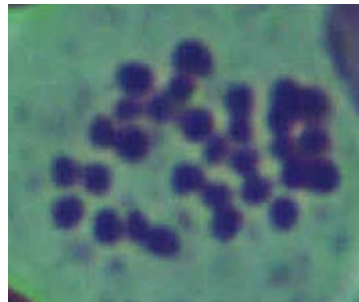


Survival rate:
70%—80%

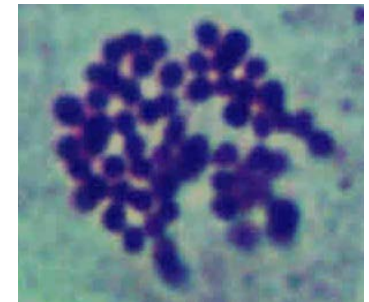


Induction frequency:
1.5%—15%

Key factors:
Seedling growth phase
Colchicine concentration
Treatment time



chromosome
doubling



◆ 320 polyploid germplasm resources had been created by colchicine induction



Representative Polyploid germplasm resources

Evaluation of polyploid mulberry germplasm

Agronomic Characters

- Tree shape
- Branch diameter and Length
- leaf shape
- ...

Economic Characters

- Weight of one piece of leaves
- One fruit weight
- Leaf length and width
- ...

Nutrient Composition

- Crude protein
- Amino acid
- fat
- Vitamin C
- ...

Functional components

- Anthocyanin
- Flavone
- Polyphenol
- Polysaccharide
- Resveratrol
- ...

Disease Resistance

- Bacterial wilt
- Red rust
- Bacterial Blight
- Sclerotinia

$4x \times 4x$, $4x \times 2x$ and $4x \times 2x$



65 cross combinations



Comparison tests



Field tests



Government authentication



2 polyploid varieties were released

**10
years**



1. Polyploid Hybrid Mulberry Variety **Yuesang 11**



Average leaf yield (kg/ha)	Moisture content (%)	Crude protein content (%) (DW)	Soluble sugar content(%) (DW)
63,000	78.11	28.2	7.33

**Be planted widely in China and be introduced into Thailand, Vietman, India, Burma,
Turkey, Egypt , Cuba and other countries**

Yuesang 11 for Silkworm

Variety	Leaves yield of 1 hectare	Cocoon yield of 100kg mulberry leaves	Cocoon yield of 1,000 silkworms
Yuesang 11	63,000kg (+26%)	8.49kg (+8.4%)	1.81kg (+7.1%)
CK	50,000kg	7.83kg	1.69kg



Yuesang 11 for vegetable

Dietary Fibre 4.10%

Vitamin C 22.36 mg/100g

Carotenoid 5.31mg/100g

Soluble protein 0.40%

Soluble sugar 1.44%

Saccharose 0.58%

Total phenols 0.36%

Total flavonoids 0.47%



Excellent Taste and Flavor

Yuesang 11 for livestock

Sample	Crude Protein (%)	Crute Fat (%)
Mulberry leaves powder	27.2~28.5	4.5~5.2
Alfalfa meal powder(CK)	17.8~20.1	2.2~3.5



Improve Meat Quality and Flavor

Mulberry Feed Production Line



2. Triploid Mulberry Variety **Yueshenda 10**



- ◆ It is a multi-purpose variety for fruit, silkworm, vegetable, tea and feed
- ◆ Be planted all over China

Fruit yield and quality of **Yueshenda 10**

The number of fruits per bud	Weight of single fruit (g)	Fruit yield (kg/ha)	Juice percentage (%)	Sugar Percentage (%)	Anthocyanin (mg/L)	Vc (mg/100g)
3~8	3.2~5.2	22,500 ~ 30,000	78~84.0	9~15	1040 ~ 1280	1.1~1.3



Products from Fruit of Yueshenda 10



wine



juice



vinegar

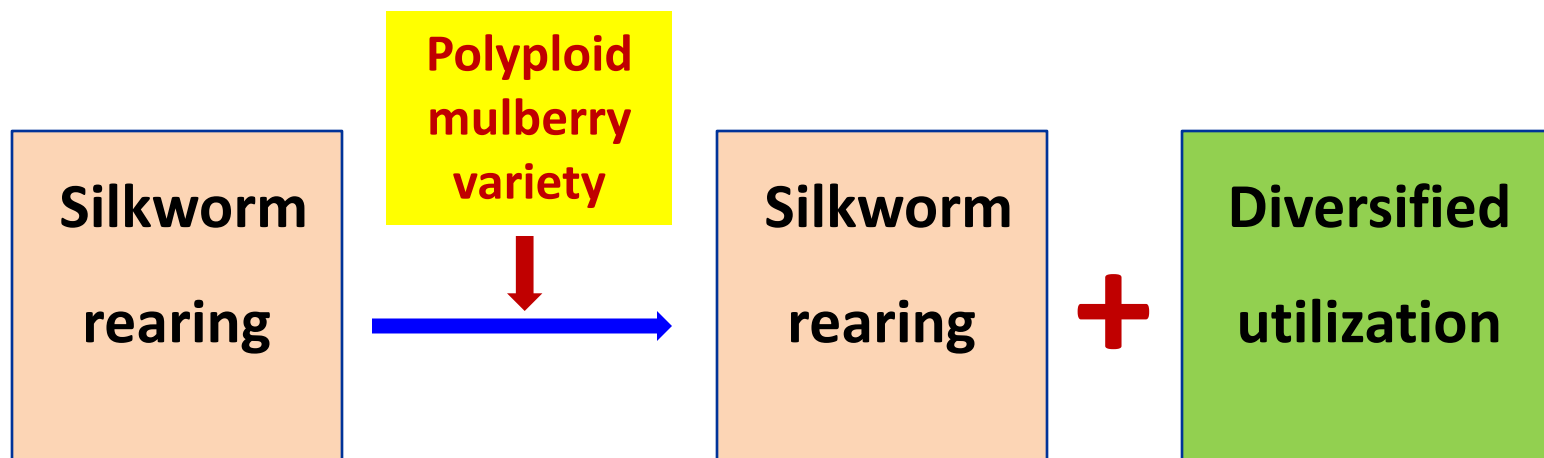


jam

Products from leaves of **Yueshenda 10**



Economic benefit is increased by more than 50%





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Thank You



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