

**Technical Working Party for Vegetables****TWV/53/11****Fifty-Third Session  
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**EXPERIENCES WITH NEW TYPES AND SPECIES***Document prepared by an expert from China**Disclaimer: this document does not represent UPOV policies or guidance*

The annex to this document contains a copy of a presentation on the “Introduction of *Ipomoea aquatica* and development of TG in China”, to be made at the fifty-third session of the Technical Working Party for Vegetables (TWV).

[Annex follows]

## Introduction of *Ipomoea aquatica* and Development of TG in China

Shanghai Sub-center for DUS Tests  
Ministry of Agriculture and Rural Affairs, PRC



## Scientific Classification

Order: Solanales  
Family: Convolvulaceae  
Genus: *Ipomoea*  
Species: *Ipomoea aquatica*  
UPOV Code: IPOMO\_AQU

### Common Names:

Water spinach, Water morning glory, Water convulvulus, Chinese water spinach, Kangkong, Swamp cabbage, Chinese spinach, Chinese watercress, Chinese convulvulus, etc.



## Botanical Description

*Ipomoea aquatica* is an aquatic or semi aquatic plant, trailing or floating, herbaceous, sometimes annual or perennial. It is the short-day plant and cross-pollinated plant.

**Stems:** terete, hollow, rooting at nodes.

**Leaves:** petiole 3-14 cm, glabrous; leaf blade variable, ovate, ovate-lanceolate, oblong, or lanceolate, 3.5-17×0.9-8.5 cm, base cordate, sagittate or hastate, occasionally truncate, margin entire or undulate, apex acute or acuminate.

(From the Flora of China)



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## Botanical Description

**Flowers:** inflorescences 1-3(-5)-flowered, peduncle 1.5-9 cm; pedicel 1.5-5 cm; corolla white, pink, or lilac, with a darker center, funnelform, 3.5-5 cm; stamens unequal; ovary conical.

**Fruits:** capsule ovoid to globose, ca. 1 cm in diam., woody, tardily dehiscent or indehiscent. Seeds densely grayish pubescent, sometimes glabrous.



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## Variety Types

The varieties of *Ipomoea aquatica* are abundant. In cultivation, according to different classification basis, the varieties can be divided into different types.

Several varieties are recognized based on growing conditions (terrestrial vs. aquatic) and plant and flower color (greenish plants with white flowers vs. purplish tinged plants with lilac flowers).

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## Origin and Distribution

*Ipomoea aquatica* is originated in China or India, and now it is widely distributed all around the World (Asia, Africa, Australia, Pacific Islands, and South America). Especially in many Asian countries (Bangladesh, Cambodia, China, India, Indonesia, Laos, Malaysia, Philippines, Singapore, Thailand, Vietnam, etc.), the plant is grown commercially.



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## Nutritional Value per 100 g

		Vitamins		Minerals	
Energy	19 kcal	Vitamin A	315 µg	Calcium	77 mg
Carbohydrates	3.14 g	Thiamine (B1)	0.03 mg	Iron	1.67 mg
Dietary fiber	2.1 g	Riboflavin (B2)	0.1 mg	Magnesium	71 mg
Fat	0.2 g	Niacin (B3)	0.9 mg	Manganese	0.16 mg
Protein	2.6 g	Pantothenic acid (B5)	0.141 mg	Phosphorus	39 mg
		Vitamin B6	0.096 mg	Potassium	312 mg
		Folate (B9)	57 µg	Sodium	113 mg
		Vitamin C	55 mg	Zinc	0.18 mg

Source: USDA Nutrient Database

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## Main Uses

### Culinary Uses

- It is a common ingredient in Southeast Asian dishes.
- Tender shoots or leaves are used fresh as salad, or steamed, boiled, or stir-fried.

### Medicinal Uses

- Used in the treatment of nervous and general debility, high blood pressure, piles, worm infections, leprosy, jaundice and liver complaints.

### Ecological Uses

- Purification of eutrophic water
- Accumulation of heavy metals like Cd in soils

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## Overview in China

*Ipomoea aquatica* has been an edible vegetable in China since at least A.D. 300. Varieties cultivation and breeding have been carried out in the fourth century. In 'Chinese Vegetable Variety Resources Directory', 137 varieties of *Ipomoea aquatica* have been recorded.



The Natural History

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## Overview in China

The harvesting season of *Ipomoea aquatica* is in the off-season of leafy vegetable supply. The disease and insect pests of it are less than other summer and autumn leafy vegetables, and the production cost and pesticide pollution are lower than other vegetables. The annual production area is above 15,000 ha, and the yield is about 75,000 kg/ha. It is easy to obtain stable and high yield, and widely sold in the market.



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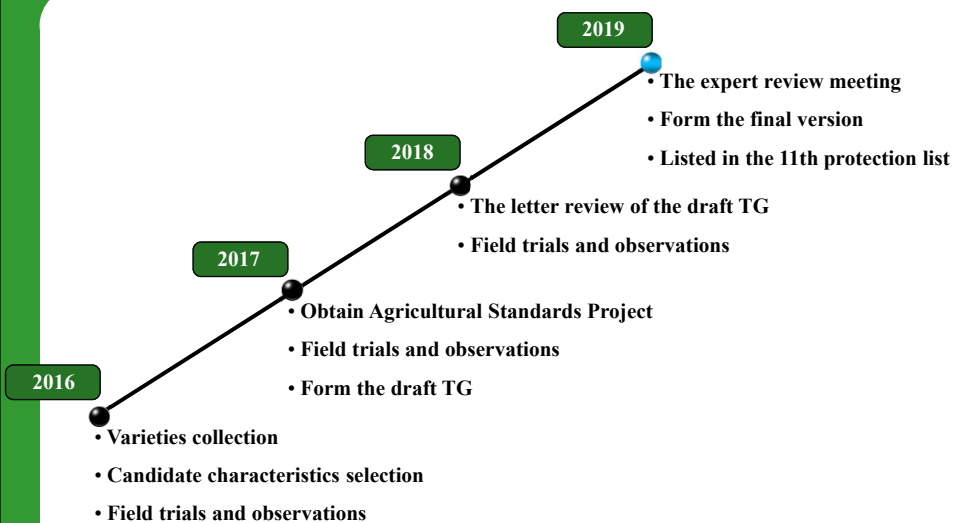
## Applications and Test Guidelines

There are 12 applications in China and 2 applications in Vietnam for the PVP of *Ipomoea aquatica* (updated on 2019-05-01).

Currently, there is no UPOV test guidelines for *Ipomoea aquatica*.

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## Chinese Test Guidelines



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## TG Contents

1	Subject of These Test Guidelines
2	Normative Documents
3	Terms and Definitions
4	Legend
5	Material Required
6	Method of Examination
7	Assessment of Distinctness, Uniformity and Stability
8	Table of Characteristics
9	Grouping Characteristics
10	Technical Questionnaire
Appendix A	Table of Characteristics
Appendix B	Explanations on the Table of Characteristics
Appendix C	Technical Questionnaire

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## Some Points

### **Material Required:**

The minimum quantity of plant material, to be supplied by the applicant, should be: 200 g seeds or 60 seedlings.

### **Number of Growing Cycles:**

The minimum duration of tests should normally be 2 growing cycles.

### **Test Design:**

Each test should be designed to result in a total of at least 60 plants, which should be divided between at least two replicates.

### **Number of Plants / Parts of Plants to be Examined:**

Unless otherwise indicated, all observations on single plants should be made on 20 plants or parts taken from each of 20 plants and any other observations made on all plants in the test.

### **Assessment of Uniformity:**

For the assessment of uniformity, a population standard of 1% and an acceptance probability of at least 95% should be applied.

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## Table of Characteristics

No.	Basic Characteristics	No.	Basic Characteristics	No.	Additional Characteristics
1	Seedling: anthocyanin coloration of hypocotyl	14	Leaf blade: shape	27	Seedling: diameter of hypocotyl
2	Seedlings: Hypocotyl length	15	Leaf blade: shape of apex	28	Inflorescence: number of florets
3	Cotyledon: lobes length	16	Leaf blade: shape of base	29	Inflorescence: length of peduncle
4	Cotyledon: lobes width	17	Leaf blade: edge type	30	Inflorescence: diameter of peduncle
5	Cotyledon: leaf length	18	Leaf blade: intensity of green color	31	Flower: diameter of corolla
6	Cotyledon: leaf width	19	Leaf blade: length	32	Flower: pedicel length
7	Cotyledon: petiole length	20	Leaf blade: width	33	Seed: coat color
8	Plant: growth habit	21	Leaf blade: petiole length		
9	Plant: height	22	Leaf blade: diameter of petiole		
10	Stem: length of internode	23	Seedling: time of beginning of flowering		
11	Stem: diameter of internode	24	Seedling: Initial flower node position		
12	Stem: color	25	Flower: corolla color	*1-7, 27: Sexual reproduction varieties only	
13	Stem: wart	26	Flower: stigma color		

## Characteristics Classification

**Expression** 3 QL, 7 PQ and 23 QN

**Observation** 13 VG, 1 MG and 19 MS

11 characteristics in TQ

**Function**

5 grouping characteristics

▪ Seedling: anthocyanin coloration of hypocotyl

▪ Plant: growth habit

▪ Stem: color

▪ Stem: wart

▪ Flower: stigma color

## Explanations for Individual Characteristics

Ad. 1: Seedling: anthocyanin coloration of hypocotyl



Absent  
1°



Present  
9°

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## Explanations for Individual Characteristics

Ad. 8: Plant: growth habit



Upright  
1°



Semi-upright  
2°

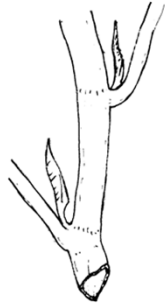


Prostrate  
3°

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## Explanations for Individual Characteristics

Ad. 13: Stem: wart



Absent.

1.



Present.

9.

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## Explanations for Individual Characteristics

Ad. 14: Leaf blade: shape



Linear.  
1.



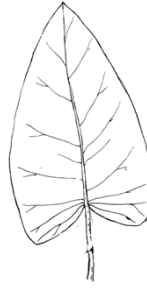
Lanceolate.  
2.



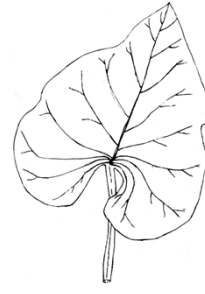
Arrow.  
3.



Triangular.  
4.

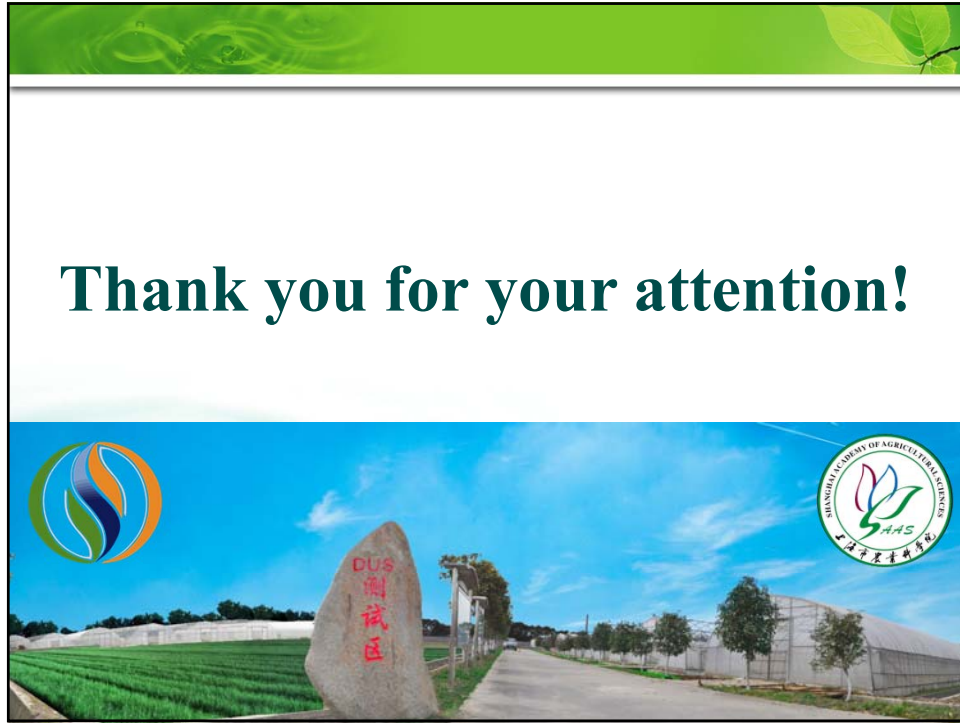


Ovate.  
5.



Broad ovate.  
6.

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