Quinoa Industry Development in China

By: REN Gui-xing
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Brief introduction of ICS

- 4 research departments, 357 staff
- 3 academicians, 95 professors
- 1600 papers (SCI), 300 books
- 240 certified varieties, 290 issued patents
- The 2nd biggest genebank, with more than 400 000 germplasm
Brief introduction of ICS

- The Crop Science Society of China (CSSC) belongs to ICS
- 19 committees belong to the society
- Quinoa Committee of the CSSC was founded in 2015
Brief introduction of ICS

International cooperation project for quinoa between ICS and UNALM:

China-Peru Joint Research and Demonstration of Quinoa Processing Technology

Visit Dr. Luz Rayda Gomez Pando and Dr. Ritva Ann-Mari Repo-Carrasco Va of UNALM in Peru, 2015
Team achievements:

1\textsuperscript{st} industrial standard for quinoa in China

1\textsuperscript{st} translated book for quinoa in Chinese

9 papers (3 SCI indexed), 3 patents

Quinoa cultivation and breeding in China
In 1960s, the formerly Institute of Crop Breeding and Cultivation, Chinese Academy of Agricultural Sciences (CAAS) firstly introduced quinoa germplasm to China.
In 1988, the formerly XiZang Agriculture and Animal Husbandry College got 3 quinoa varieties from Bolivia and started the first growing of quinoa in China.

1.1 Milestone of quinoa history in China
1.1 Milestone of quinoa history in China

In 2008, large scale quinoa cultivation started in Shanxi province.
Distribution of quinoa in China in 2016

<table>
<thead>
<tr>
<th>Province</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shanxi</td>
<td>2000</td>
</tr>
<tr>
<td>Gansu</td>
<td>2000</td>
</tr>
<tr>
<td>Qinghai</td>
<td>2000</td>
</tr>
<tr>
<td>Inner Mongolia</td>
<td>400</td>
</tr>
<tr>
<td>Jilin</td>
<td>300</td>
</tr>
<tr>
<td>Hebei</td>
<td>270</td>
</tr>
<tr>
<td>Yunan</td>
<td>330</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>7300</strong></td>
</tr>
</tbody>
</table>
1.2 Quinoa cultivation in Shanxi

- The first province to grow quinoa in large scale
- Jingle County: Chinese Quinoa Hometown
- Several enterprises lead the cultivation technology research
- No official certified cultivar
### 1.3 Quinoa cultivation and breeding in Gansu

- Northwest of China, altitude of 1000-3400 m
- 2010, quinoa was introduced by the Animal Husbandry, Pasture and Green Agriculture Institute, Gansu Academy of Agricultural Sciences
- 2014, the first provincially registered cultivar in China, “Longli-1”

<table>
<thead>
<tr>
<th>Name</th>
<th>Episperm color</th>
<th>Yield (kg/ha)</th>
<th>Growth duration (d)</th>
<th>Thousand kernels weight (g)</th>
<th>Protein (g/kg)</th>
<th>Fat (g/kg)</th>
<th>Production area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Longli-1</td>
<td>White</td>
<td>2007</td>
<td>108-121</td>
<td>2.97-3.34</td>
<td>170.3</td>
<td>64.0</td>
<td>1500-3000 masl in Gansu</td>
</tr>
</tbody>
</table>
Quinoa variety: Longli-1
Northwest of China, low temperature, dry environment, high altitude.

9 cities or counties grow quinoa, highest yield 6138 kg/ha.

“Qingli-1” was provincially certified in 2016.

Machines are well applied

<table>
<thead>
<tr>
<th>Name</th>
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<th>Thousand kernels weight (g)</th>
<th>Protein (g/kg)</th>
<th>Fat (g/kg)</th>
<th>Production area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qingli-1</td>
<td>White</td>
<td>4977</td>
<td>140-155</td>
<td>3.01-3.33</td>
<td>148.0</td>
<td>58.6</td>
<td>2300-3000 masl in Qinghai</td>
</tr>
</tbody>
</table>
Quinoa sowing and harvest by machine in China
1.5 Quinoa cultivation and breeding in Inner Mongolia

- In 1988, Inner Mongolia Agricultural University cultivated quinoa in Hohhot.
- In 2015, “Mengli-1”, was certified by the Hohhot Committee of Crop Variety Certification.
- In 2016, under the support of ICS-CAAS and Wulanchabu Agriculture and Animal Husbandry Bureau, 202 quinoa germplasm were cultivated.

<table>
<thead>
<tr>
<th>Name</th>
<th>Episperm color</th>
<th>Yield (kg/ha)</th>
<th>Growth duration (d)</th>
<th>Thousand kernels weight (g)</th>
<th>Protein (g/kg)</th>
<th>Fat (g/kg)</th>
<th>Production area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mengli-1</td>
<td>White</td>
<td>2865</td>
<td>107-115</td>
<td>2.85-3.14</td>
<td>166.0</td>
<td>64.5</td>
<td>1000-1800 masl in Inner Mongolia</td>
</tr>
</tbody>
</table>
Different quinoa germplasm in Inner Mongolia
1.6 Quinoa cultivation in Jilin

- In 2013, quinoa was cultivated by Jilin BODA Oriental Company.
- The 1st China Quinoa Industry Summit was held at Changchun City in 2015.
1.7 Quinoa cultivation in Hebei

- In 2013, quinoa was firstly cultivated with the yield of 3637.35 kg/ha
- In 2015, the only quinoa institute in China was established

A and B: Panicles in grain filling stage, C and D: Panicles in full ripe stage
1.8 Quinoa cultivation in Yunan

- Started in 2015, at Yongsheng County, leaded by Taimei Group Company
- In 2016, increased to 330 ha with the yield of 3000 kg/ha
- Machines were rarely used
Quinoa product and market in China
2.1 Quinoa company in China

- 60 registered quinoa companies, half of them located in Shanxi.
2.1 Quinoa company in China

<table>
<thead>
<tr>
<th>Company Name</th>
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<tr>
<td>山西藜麦藜麦开发有限公司</td>
<td>静乐县藜麦协会</td>
</tr>
<tr>
<td>辽宁华青藜麦农产品开发有限公司</td>
<td>静乐县藜麦协会</td>
</tr>
<tr>
<td>甘肃翔天藜麦科技开发有限公司</td>
<td>大同市城区藜麦有限责任公司</td>
</tr>
<tr>
<td>德令哈盛藜藜麦种植专业合作社</td>
<td>山西昌乐藜藜麦开发有限公司</td>
</tr>
<tr>
<td>格尔木昆仑藜藜麦种植专业合作社</td>
<td>奇岚县藜藜麦贸易部</td>
</tr>
<tr>
<td>静乐县藜藜麦种植专业合作社</td>
<td>北京天赐藜藜麦发展有限公司</td>
</tr>
<tr>
<td>五台县藜藜麦种植专业合作社</td>
<td>静乐县藜藜麦种植专业合作社</td>
</tr>
<tr>
<td>辽宁省藜藜麦种植专业合作社</td>
<td>沁源县藜藜麦种植专业合作社</td>
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2.2 Quinoa products in China

- Quinoa products in Chinese market

Pearled quinoa  |  Quinoa flour  |  Quinoa noodle
Quinoa bread

Quinoa moon cake

Quinoa yellow wine

Quinoa wine
◆ Quinoa was a new resource plant in China.
◆ In 2015, the first industrial standard for quinoa (*Milled quinoa*, LS/T 3245-2015) was approved by the State Administration of Grain.
2.3 Quinoa market in China

- Formally produced pearled quinoa is priced from 11 to 26 $/kg
- The main marketing channel is e-commerce site
- Organic product will come into the market soon
Opportunity and challenge for quinoa
3.1 Great chance to develop quinoa in China

- The cultivation area of maize will be decreased for more than 666,700 ha
- 5,000,000 ha of potato need to be rotated to restore soil and keep the yield
3.1 Great chance to develop quinoa in China

- Climate change and water resource shortage are calling for new crops
- Healthy diet is becoming more and more popular in China
3.2 Challenges in quinoa development

- Lack of variety with big-size and white-color seed
- Fertilization, pest control, and disease control research must be improved
- Products diversification and market development
3.3 Prospect of quinoa in China

- China is a country with big population.
- Food production and safety is always the basic issue for the government.
- Quinoa, with its great nutrition and resistance to biotic stresses, will certainly play an important role in Chinese agriculture.
Acknowledgements

**Project support:**
- Science and Technology Partnership Program, Ministry of Science and Technology of China (KY201402023)
- The Agricultural Science and Technology Program for Innovation Team on Minor Grain Crops Nutrition and Function, CAAS.

**Professors support:**
- Professor CHI Dezhao from Qinghai Academy of Agriculture and Forestry Sciences
- Professor YANG Farong from Gansu Academy of Agricultural Sciences
- Professor ZHAO Gang from Chengdu University
- Associate professor ZHOU Haitao from Zhangjiakou Academy of Agricultural Sciences
Thank you very much for your attention!

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Chinese Quinoa Video by Gansu Yongchang Yangshengsanbao Food Company Ltd.