Profile of swine industry and control of swine diseases in China

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Content

- Profile of China swine industry
- Main diseases in swine herds
- Strategies of swine diseases prevention and control in China
Profile of China swine industry-regional distribution

- **Main producing area**: along the Yangtze River, North China and some major grain-producing areas, among Yangtze River valley accounts for 42.61%, northern China accounts for 22.5%, southeast coast accounts for 16.84%. These areas are given priority to with modern large-scale farms.

- **While southwest is Chinese traditional production of live pigs**, give priority to with backyard pig farms.
Profile of China pig industry - inventory and slaughter

- In China, the domestic pig farming is very large. In 2012, pig inventory is 467 million heads, 1.2% lower than previous year. Slaughtered 661 million heads, 5.1% higher than previous year.
The domestic pig meat is important to Chinese life. In 2012, all meat production reached 83.88 million tons, among pork production reached 53.35 million tons (about 63.6%).
Profile of China swine industry-farm mode

- The domestic pig farming is very large, but different pig farm scales and different managements lead to low level of productivity.

- Different pig farm scales and different managements also lead to the complexity of prevention and control diseases.

<table>
<thead>
<tr>
<th></th>
<th>China</th>
<th>Developed countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>饲料转化率 Feed conversion rate (FCR)/pig/year</td>
<td>育肥期2.6-2.8：1 全期3.6-3.8：1</td>
<td>育肥期2.4-2.5：1 全期3.4-3.5：1</td>
</tr>
<tr>
<td>繁殖率 Reproductive rate/sow/year</td>
<td>年均窝数2.0-2.1</td>
<td>年均窝数2.2-2.4</td>
</tr>
<tr>
<td>窝均活仔数 No. of live piglets/time/sow</td>
<td>9-9.5头</td>
<td>10-12头</td>
</tr>
<tr>
<td>每头母猪年生产肥猪 Fattening pigs/sow/year</td>
<td>16-17头</td>
<td>20-22头</td>
</tr>
</tbody>
</table>
Main diseases of pig herds in China

- **Viral diseases:**
  - Classical swine fever (CSF)
  - Porcine reproductive and respiratory syndrome (blue ear disease) (PRRS)
  - Porcine pseudorabies (PR)
  - Porcine epidemic diarrhea (PED)
  - Porcine circovirus (PCV)

- **Bacterial diseases:**
  - Haemophilus parasuis disease
  - Contagious pleuropneumonia
  - Eperythrozoonosis
CSF is still present in most provinces and regions of China. Its occurrences are endemic and sporadic.

Phylogenetic tree of 554 isolates from 1979 to 2013 was constructed with MEGA 4.1 software using the neighbor-joining method. The phylogenetic tree showed that all 554 Chinese isolates belong to group 1 and group 2, while no group 3 isolate was identified. Further analysis indicated these isolates were divided into different subgroups.
### The gene subgroups distribution of CSFV strains in China

<table>
<thead>
<tr>
<th>Group</th>
<th>Subgroup</th>
<th>Reference Strain</th>
<th>Number of epidemic Strain</th>
<th>Number of regions</th>
<th>%</th>
<th>Time of Separation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>1.1</td>
<td>HCLV AF531433.1</td>
<td>132</td>
<td>22</td>
<td>25.34%</td>
<td>1982-2010</td>
</tr>
<tr>
<td></td>
<td>1.2</td>
<td>Brescia</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Group 2</td>
<td>2.1</td>
<td>Paderborn AY072924</td>
<td>265</td>
<td>29</td>
<td>57.58%</td>
<td>1979-2011</td>
</tr>
<tr>
<td></td>
<td>2.2</td>
<td>C1W L36164.1</td>
<td>81</td>
<td>23</td>
<td>13.71%</td>
<td>1984-2008</td>
</tr>
<tr>
<td></td>
<td>2.3</td>
<td>Alfort J04358</td>
<td>16</td>
<td>7</td>
<td>2.53%</td>
<td>1985-1999</td>
</tr>
<tr>
<td>Group 3</td>
<td></td>
<td>P97TW</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

- **Group 1**, prevail in 14 provinces, counting for **25.34%** of total strains
- **Group 2**, prevail in 21 provinces, counting for **74.66%** of total strains
- **Group 3**, not identified in China yet

Joint FAO/OIE Workshop on Swine Disease Control in Asia
CSFV - new characters

- Atypical and reproductive failure increase.
- The newborn piglets infection increase.
- Mixed infection serious.
- The immunization program is not reasonable, which cause seriously immunization failure phenomenon.
The current pseudorabies virus had been isolated from Chinese swine herds since 2011, the affected pigs had high fever (>40.5°C), anorexia, coughing, respiratory distress, conjunctival serous and mucinous secretion, and posterior paralysis. Abortion was observed in pregnant sows. The pigs vaccinated with attenuated live pseudorabies virus vaccines still showed clinical signs of pseudorabies virus during the outbreak.
**Joint FAO/OIE Workshop on Swine Disease Control in Asia**

**Clinical symptoms**

- Temperature
  - gC, gD, gE mutation
  - Phylogenetic tree

**Porcine Pseudorabies virus - new characters**
Porcine Pseudorabies epidemic situation

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gC, gD, gE mutation

Phylogenetic tree

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The current strains were widely spread.

The gene mutations and deletions of the current popular pseudorabies virus were observed.

The antigenicity of the pandemic pseudorabies virus has changed, the used vaccine cannot fully protect the pandemic strain.

The serum antibody cannot be completely neutral current pandemic strain.
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Temperature

**Clinical symptoms**

**gC, gD, gE mutation**

**Phylogenetic tree**
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Porcine circovirus epidemic situation

- Porcine circovirus is widely spread in swine herds, but very few clinical cases caused by the virus alone.
- The different genotypes of porcine circovirus were observed.
- The recombinant and gene mutants strains were identified.
The gene subgroups distribution of PCV strains in China

The gene type of porcine circovirus strains in different provinces
Porcine circovirus epidemic situation

- Porcine circovirus virus widely spread in swine herds, but very few clinical cases caused by the virus alone.
- The different genotypes of porcine circovirus were observed.
- The recombinant and gene mutation strains were identified.
Identification of an emerging recombinant cluster in porcine circovirus type 2.
Porcine Epidemic Diarrhea epidemic situation

According to the national swine disease continuously monitor and survey results, the current main pathogens of pig epidemic diarrhea are pig epidemic diarrhea virus and transmissible gastroenteritis virus in Chinese swine herds.
Porcine Epidemic Diarrhea epidemic situation

- The current pig epidemic diarrhea virus had been isolated from Chinese swine herds since 2010, cause huge economic losses. During the 2011-2013, the disease was populated in large-scale swine farms, the disease causes newborn piglets within 10 days is close to 100% of the deaths. Since 2013, the disease had a tendency to ease.
Porcine Epidemic Diarrhea Virus new characters

- The pig epidemic diarrhea virus new isolates have some mutations.
- The variation characteristics of PEDV new strains are similar to South Korea KUN strain.
- The differences were observed in PEDV new variants and vaccine strains, especially S protein differences.
- The existing vaccine does not provide complete protection to the pandemic strain because of antigen mutation.
Prevention and control of swine diseases in China

- Establish detailed strategies for the swine disease prevention and control. Such as national compulsory vaccination in pig herds.
- Strengthen epidemic monitoring and reporting.
- Increase investment and improve technology.
- Strengthen the flow of control and quarantine supervision.
Prevention and control of swine diseases in China

➢ Strengthen the publicity of scientific knowledge.

➢ Promulgate of a national long-term animal disease prevention plan (2012-2020), which will provide guidance for prevention and control swine diseases in China.
Thank You!