

External Biosecurity Risk Assessment for Large-scale Pig Farms



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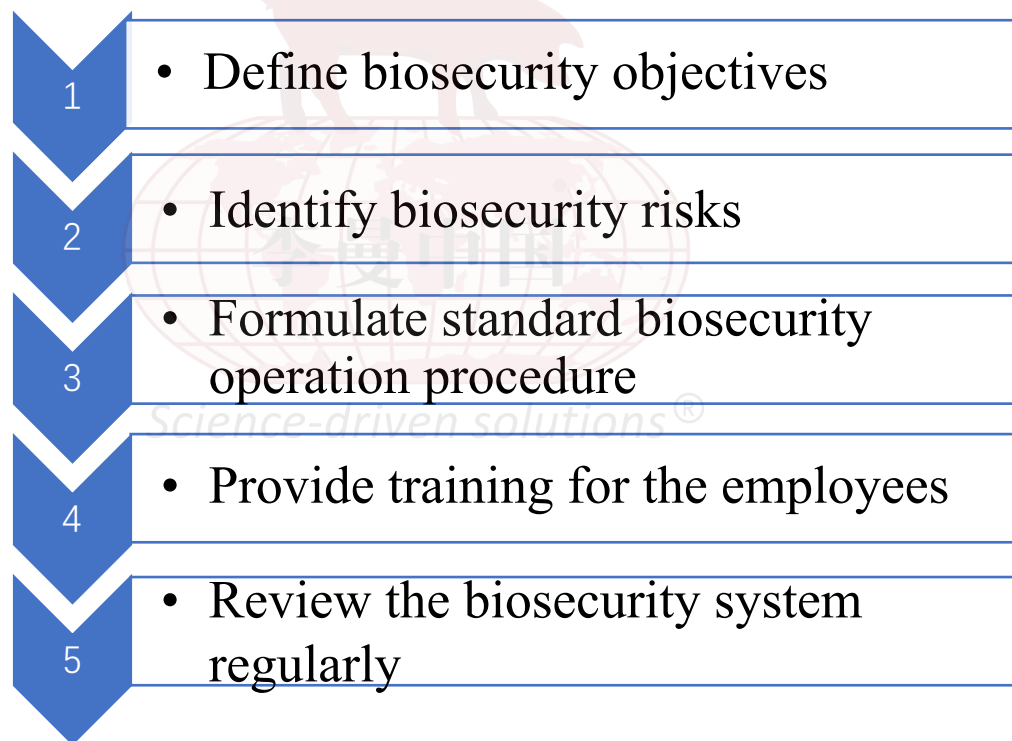


Backgrounds

- After the outbreak of African swine fever, as the only effective prevention and control measure at present, biosecurity has been recognized and valued in a wide variety of pig breeding enterprises. In recent years, major pig enterprises have invested a large number of human, material and financial resources in biosecurity control measures in order to prevent and control African swine fever.
- At present, biosecurity is still in a process of cognition and exploration. Driven by the interests of cost reduction and efficiency improvement, major pig enterprises are also constantly exploring and verifying the operability and effectiveness of biosecurity control measures. They have developed a set of simple, effective and practicable scientific preventive measures by simplifying processes and standardizing operations, so as to achieve efficiency and cost reduction.

Background

Procedure of establishing biosecurity system:

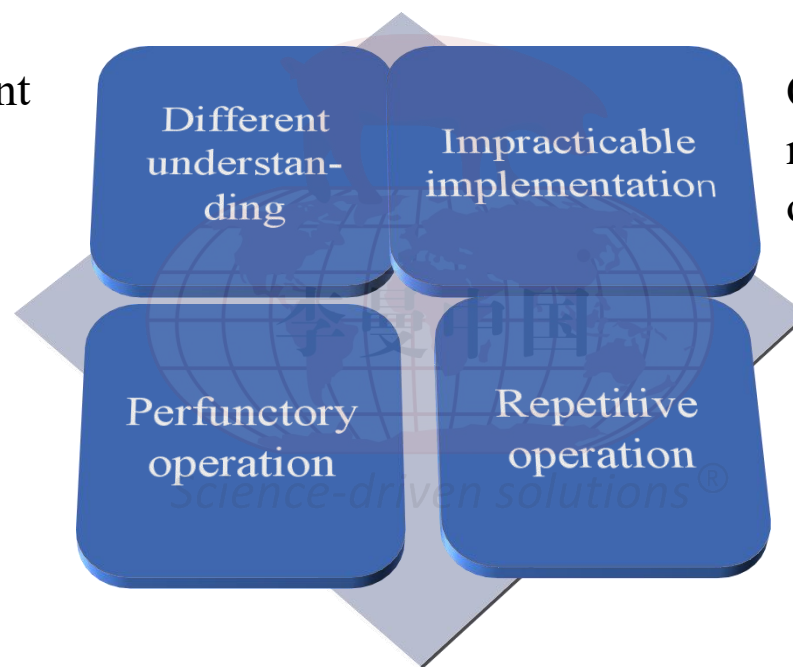


Background

Problems in the implementation of biosecurity measures:

Different employees have different understanding of the biosecurity program, which may lead to different operations in implementation.

Perfunctory operation and improper execution.



Complicated operation process makes it impossible to implement on site.

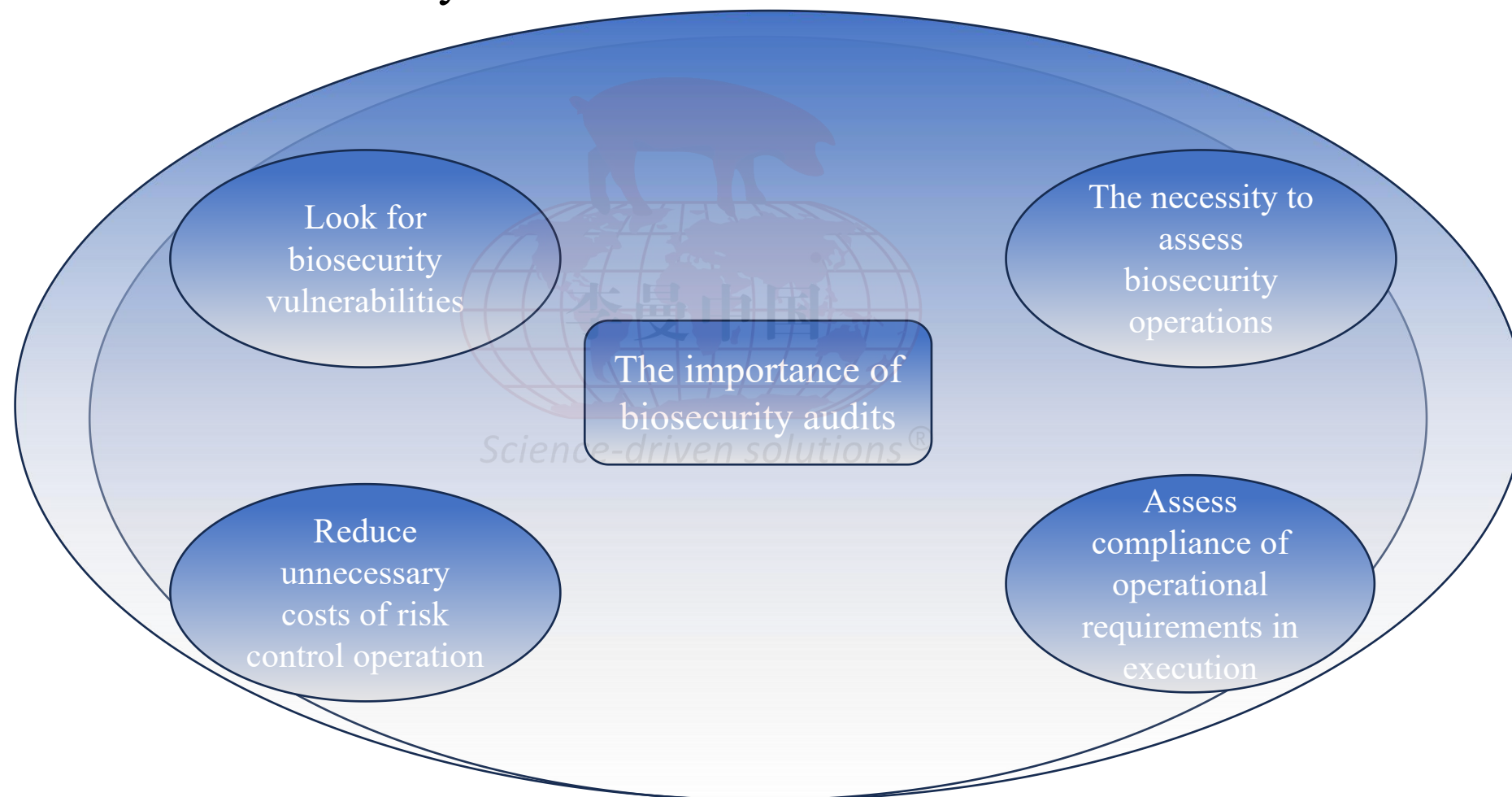
Based on the idea of "doing more is not harmful", field managers have increased their measures excessively to the initial program, resulting in higher biosecurity control input costs.



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Background

The importance of biosecurity audits:



Materials and Methods:

Pig farm information audit:

- A total of 7 large-scale pig farms were assessed for their external biosecurity processed this time.
- The size of pig farms range from 700-3,000 pigs
- Different system sources
- Pig farms are distributed in different parts of China

Materials and Methods:

The template used for the audit:



Topigs Norsvin PROGRESS IN PIGS

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Global Biosecurity Assessments

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<input type="checkbox"/>	Template	Last published ↓	Scheduled	Access	
<input type="checkbox"/>	Global Gilt Developer or Testing Facility Biosecurity Risk Assessment	1 Aug 2023	No	🔒 19 👤 8	Start inspection ⋮
<input type="checkbox"/>	Topigs Norsvin Feed Mill Biosecurity Assessment	1 Aug 2023	No	🔒 19 👤 7	Start inspection ⋮
<input type="checkbox"/>	Global Sow Farm External Biosecurity Risk Assessment	1 Aug 2023	Yes	🔒 19 👤 9	Start inspection ⋮
<input type="checkbox"/>	Global AI Station External Biosecurity Risk Assessment	1 Aug 2023	No	🔒 19 👤 7	Start inspection ⋮

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Materials and Methods:

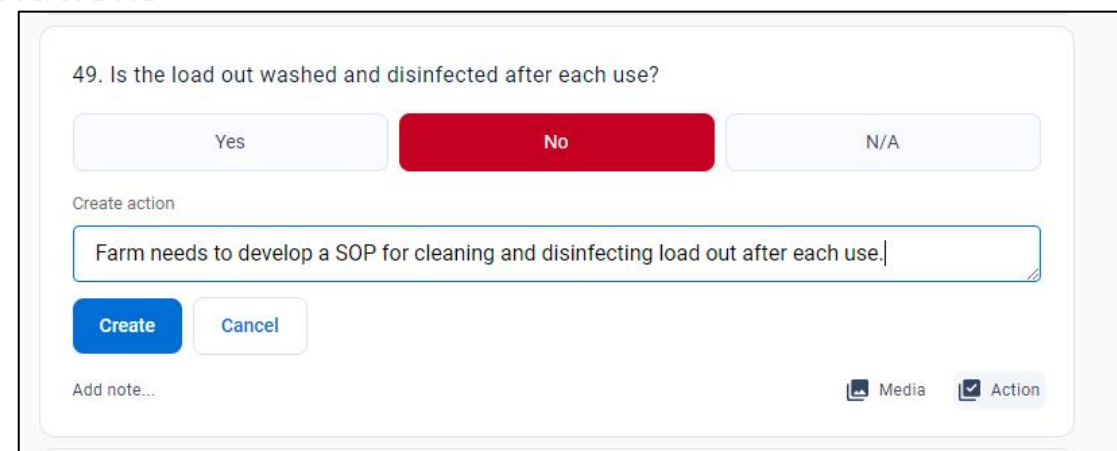
Content of external biosecurity audit :



Materials and Methods:

Audit methods and results interpretation:

- On-site inspections to assess compliance of operations
- Select answers to questions: "YES" or "No" or "Unknown" according to the audit questions.
- For non-compliant items, corrective measures will be discussed on-site, the urgency of corrective actions will be determined, and the completion of corrective actions will be regularly kept track of through email.
- The better pig farm scores:
 - 85% or more of total score
 - 85% or more of each score



49. Is the load out washed and disinfected after each use?

Yes No N/A

Create action

Farm needs to develop a SOP for cleaning and disinfecting load out after each use.

Create Cancel

Add note...

Media Action

Materials and Methods:

Audit report:



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Global Sow Farm External Risk Biosecurity Assessment

262463 - FAMILY VALUE AG, LLC - Satellite Nucleus
/ 262463 / Mitch Christensen / 24 May 2021 Complete

Score	84.6%	Failed Items	13	Actions	0
Site	262463 - FAMILY VALUE AG, LLC - Satellite Nucleus, North America, USA				
Conducted on	24th May, 2021 10:30 AM CDT				
Prepared by	Mitch Christensen				
Farm Type	Nucleus				
BLN	262463				
Sow Herd Size	1200				
Location	Freestone Dr, Glen Flora, WI 54526, USA (45.4725148, -90.87515169999999)				

Private & Confidential 1/14

Failed Items 8 failed

Biosecurity Questions

Does the site have biosecurity signage in place that is visible from vehicles approaching the barn? **No**

Biosecurity Questions

Is there a designated parking area clearly identified? **No**

Biosecurity Questions

Are the bin pads clean of all feed spills? **No**




Photo 2

Biosecurity Questions

Is the mortality disposal method being managed properly? **No**


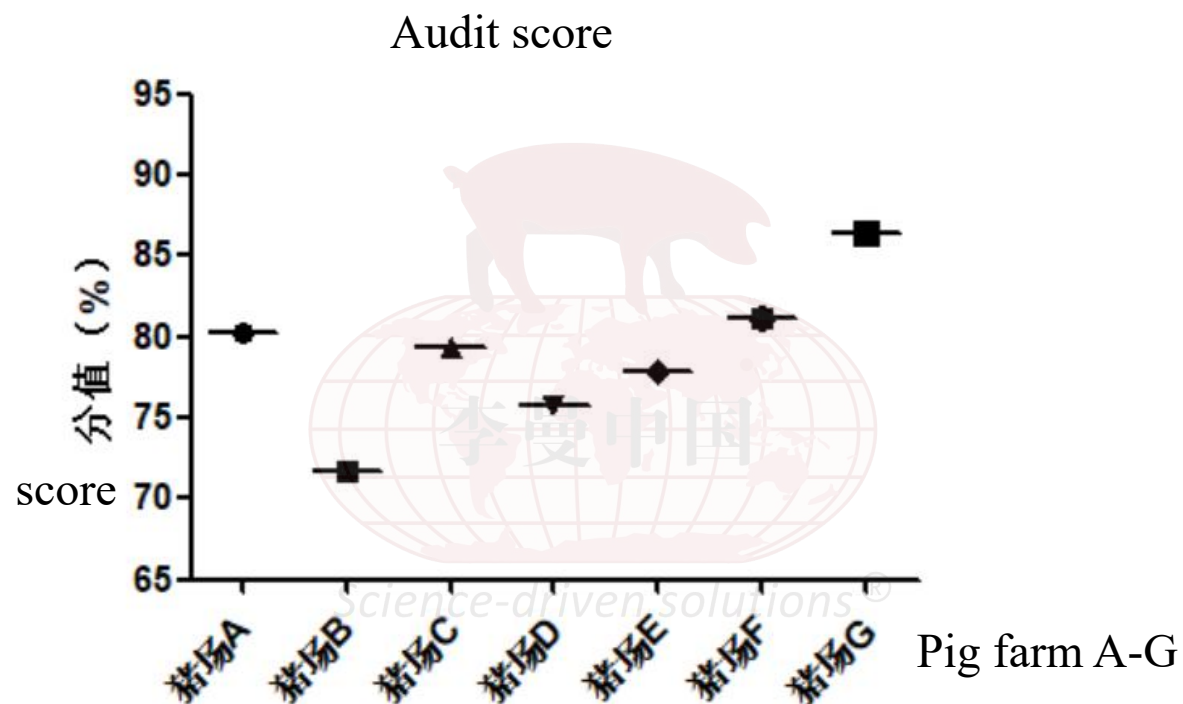


Photo 3

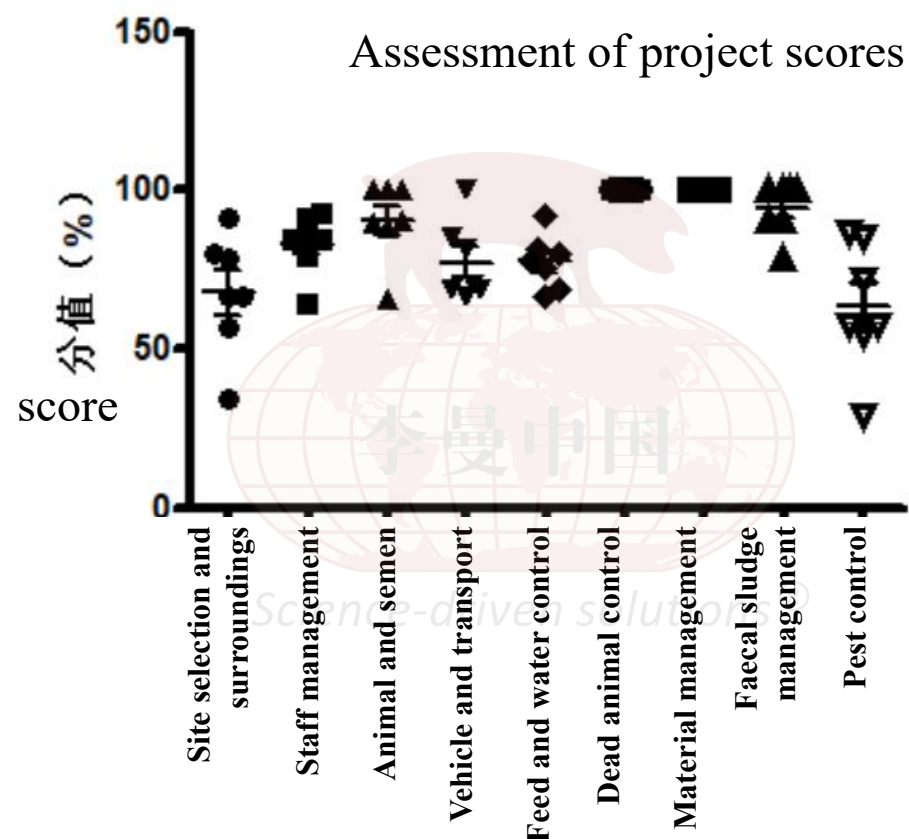
Analysis of audit results:



Total score: Among the seven pig farms, the highest score was 86.46% while the lowest score was 71.74%, indicating that different pig enterprises have biosecurity risk vulnerabilities in varying degree or operational errors in biosecurity implementation.



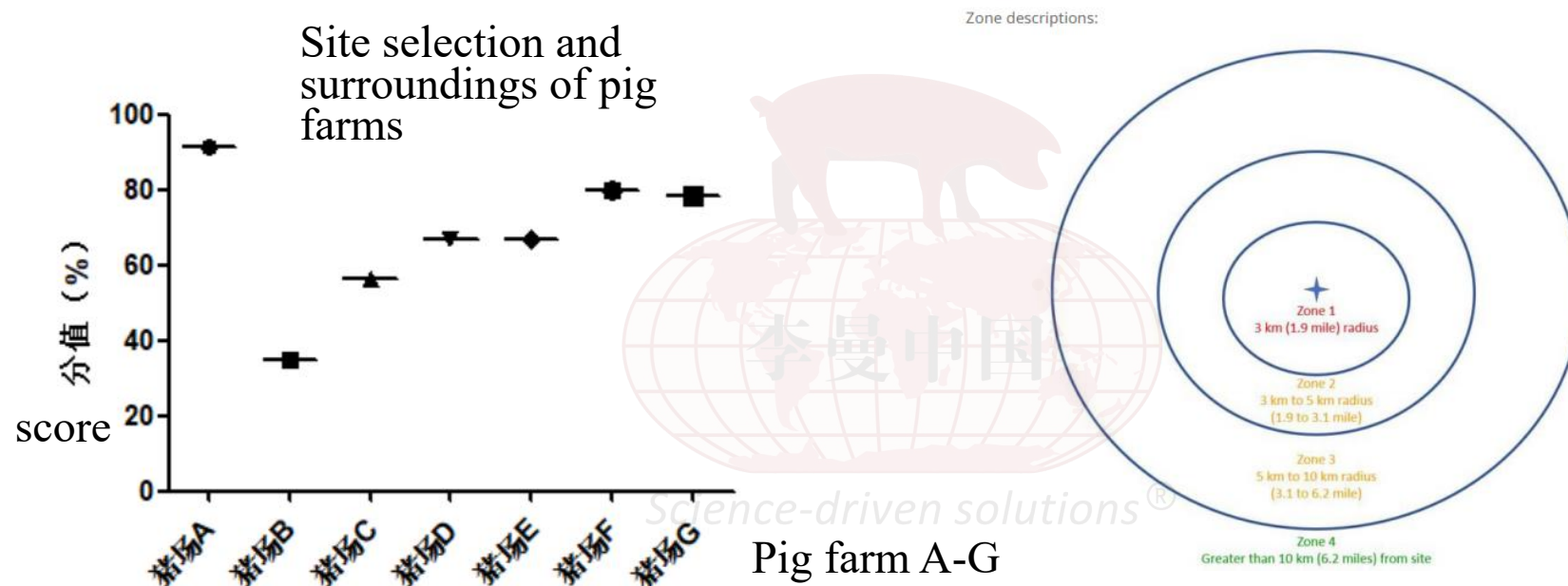
Analysis of audit results:



The biosecurity risks range from low to high: Dead animal control=Material management > Faecal sludge management > Animal and semen > Staff management > Feed and water control > Vehicle and transport > Site selection and surroundings > Pest control

Analysis of audit results:

1. Score analysis of site selection and surroundings:

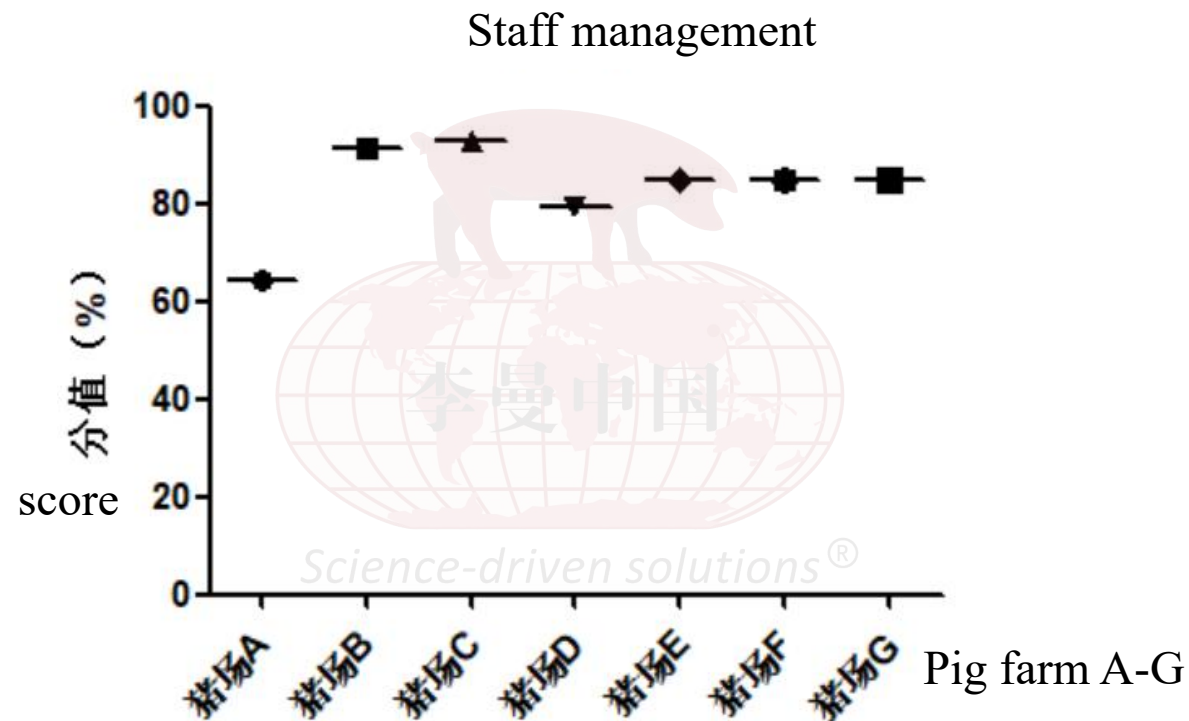


The site selection of only one pig farm is relatively ideal. (91.74%)。

The site selection scores of other six pig farms are relatively low.

Analysis of audit results:

2. Staff management score:



- The scores of five farms are close to 85% or higher, indicating that a lot of efforts have been put into staff management.
- However, some farms neglected staff management.

Problems in the audit process of staff management:

- Design and use of benches:
 - No bench
 - Poorly designed benches
 - Removing the shoes improperly



Bench Entry Poster Example

Bench Entry Procedure
Protocolo de entrada en banco

- 1** Once inside the personnel entrance, sign in to the visitor log. Sit on the bench keeping your shoes on the dirty side.
- 2** Remove your shoes without touching the shoe bottoms and without letting your socks touch the floor.
- 3** Swing both legs over the bench to the transition side.
- 4** Proceed to the dirty side of the shower and complete the shower entry procedure.

Problems in the audit process of staff management:

- Poorly designed shower area

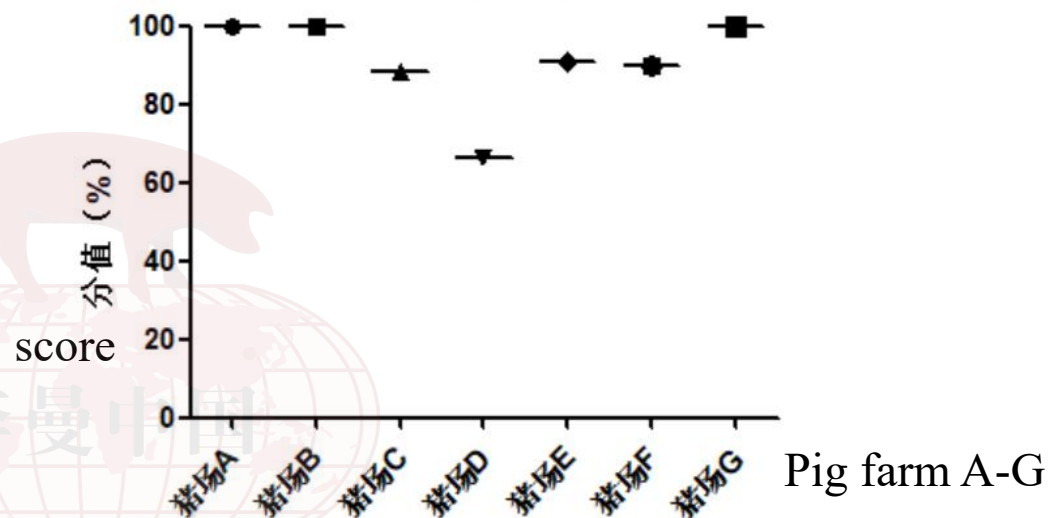


The absence of water barriers results in dirty water from the shower area flowing to both sides.

Analysis of audit results:

3. Animal and semen introduction score:

Management of animal and semen introduction



After the outbreak of ASF, the isolation and testing of newly introduced gilts or repopulation have been strengthened, and special isolation units have been set up. For purchased semen, the health assessment of artificial insemination stations and the testing of relevant pathogens have also been enhanced.

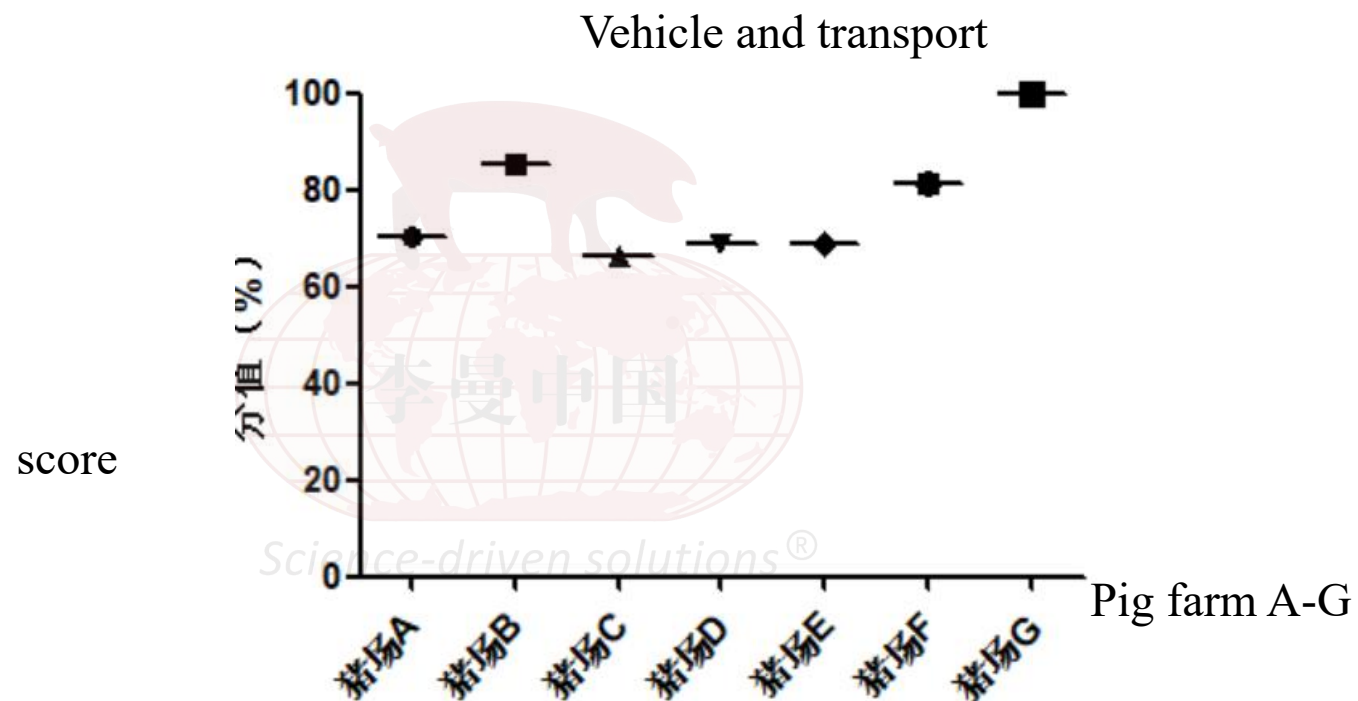
According to the results of the review, some pig farms have biosecurity risk vulnerabilities (66.12 %).

Problems in the audit process of animal and semen:

- Insufficient quarantine period (less than 28 days) for introduced gilts may pose a risk of pigs carrying the virus into the population.
 - Quarantine periods need to be set according to the maximum incubation period of the disease.
- Purchased semen was not reported as negative about the relevant pathogen prior to use
 - PRRSV、ASFV、PR-gE
 - Selection of test samples:
 - semen: Easily available, but samples are not easily extracted and the pathogen enters the semen late.
 - blood sample: Not readily available; blood is taken at the time of semen collection. Samples are more sensitive and can be detected quickly in the blood if infected.

Analysis of audit results:

4. Vehicle and transport score:



Cleaning and disinfection centers have become an essential facility of pig farms. Through reviewing processes such as vehicle cleaning and disinfection procedures, inspection of cleaning results, driver operation requirements and leaning and disinfection of transfer vehicles, we get to know that 71.42% (5/7) of pig farms have certain biosecurity risk control vulnerabilities in vehicle management and transport.

Problems in the audit process of vehicle management:

■ Inspection of vehicle cleaning and assessment:

- Whether a third party regularly checks if vehicles are properly cleaned.
- Whether the vehicle cleaning inspection procedure is formulated and the responsible staff are appointed.





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Problems in the audit process of vehicle management :

■ High-temperature drying of vehicles

- Is the temperature probe calibrated regularly??
- Is the temperature shown on the monitor the actual temperature of the inner surface of the compartment?
 - The purpose of high-temperature drying of vehicles is to ensure that the temperature of the inner surface of the compartment is up to standard.
- Is the water in the vehicle adequately controlled before drying?
 - Vehicles with water can't be treated effectively with high temperatures
 - Approximately 85.7% (6/7) of the pig farms in this review still had water stains after the vehicles were dried.



Problems in the audit process of vehicle management :



■ Management of transfer vehicles

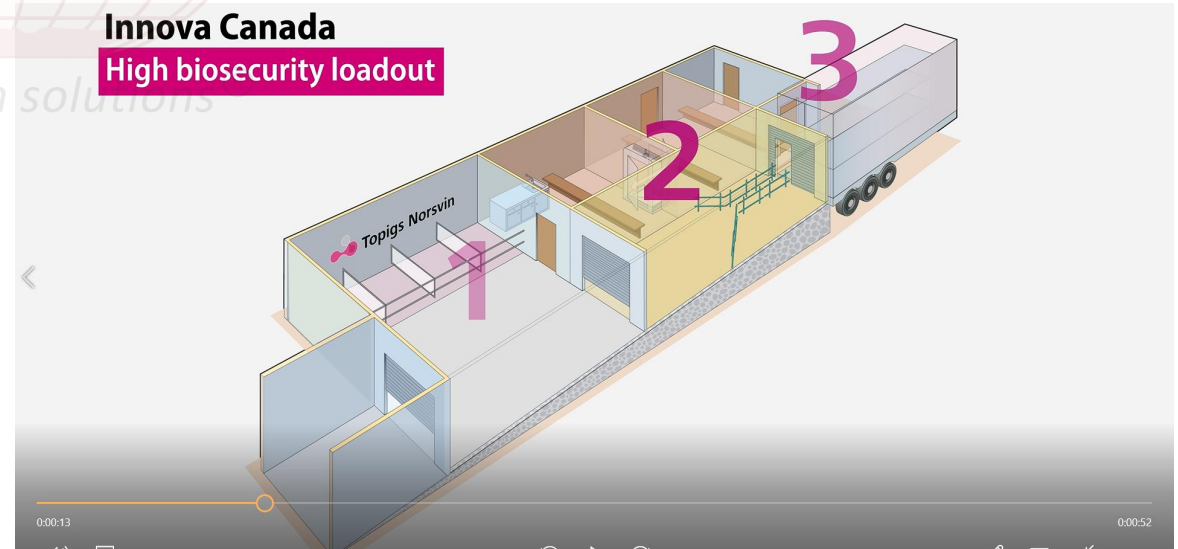
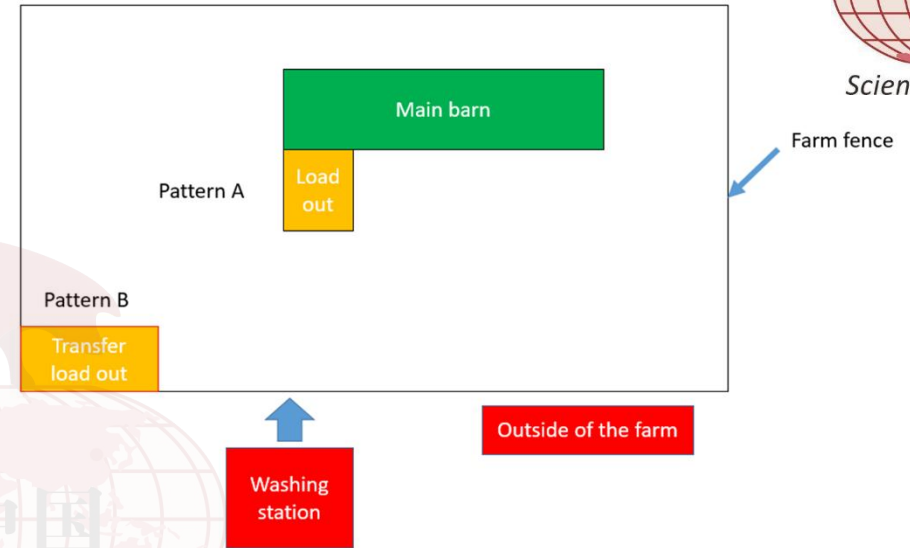
- After the outbreak of ASF, the way of transporting pig has changed

- Option 1: Direct docking of external vehicles with pig loading ramp
- Option 2: transfer of pigs with internal transfer vehicles

- Using internal transfer vehicles may lead to higher costs (vehicle cleaning and disinfecting, manpower)

- It is impossible to ensure that vehicles are thoroughly cleaned, disinfected and treated at high temperature after each use before they are used for the next batch of pigs.

- Optimise the design of pig loading ramp:
 - Divide the regions and define the independence of each region
 - Designate responsible staff to take charge



Analysis of audit results:

5. Feed and water management score:

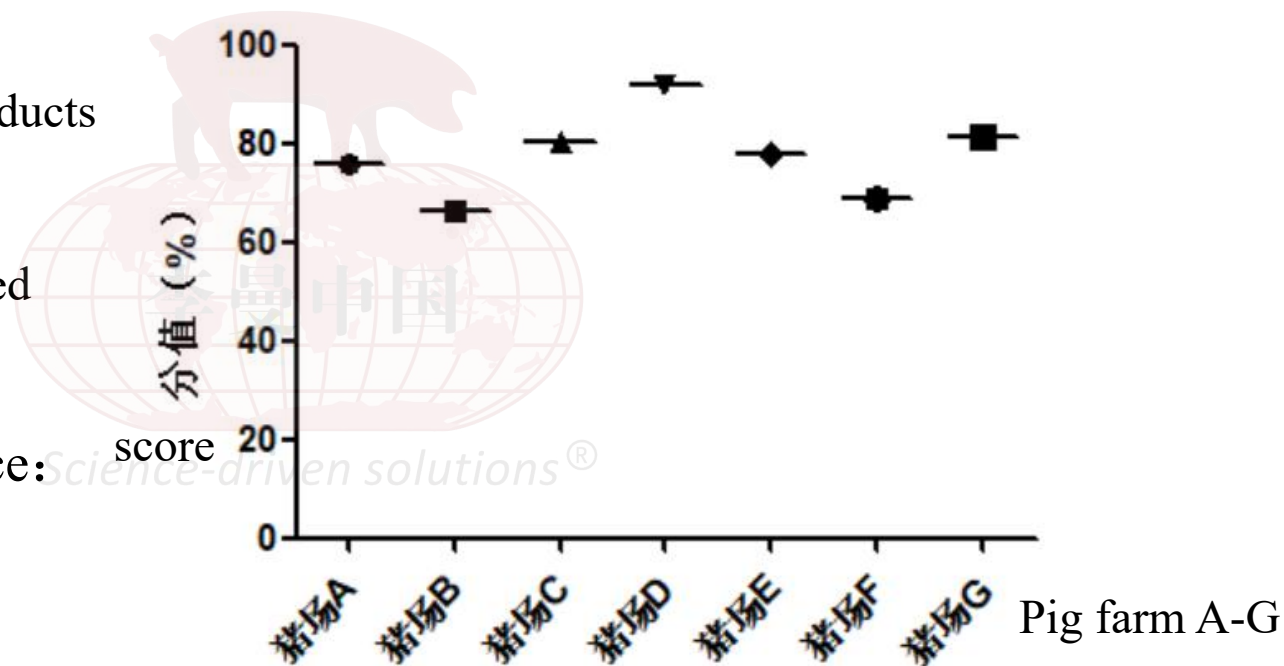
Feed control measures in place:

- Stop the addition of pig source products in feed
- High-temperature pelletizing of feed
- Biosecurity controls in feed mills

Water sources control measures in place:

- Disinfection of water sources

Feed and water management



Problems in the audit process of feed and water management:

Feed:

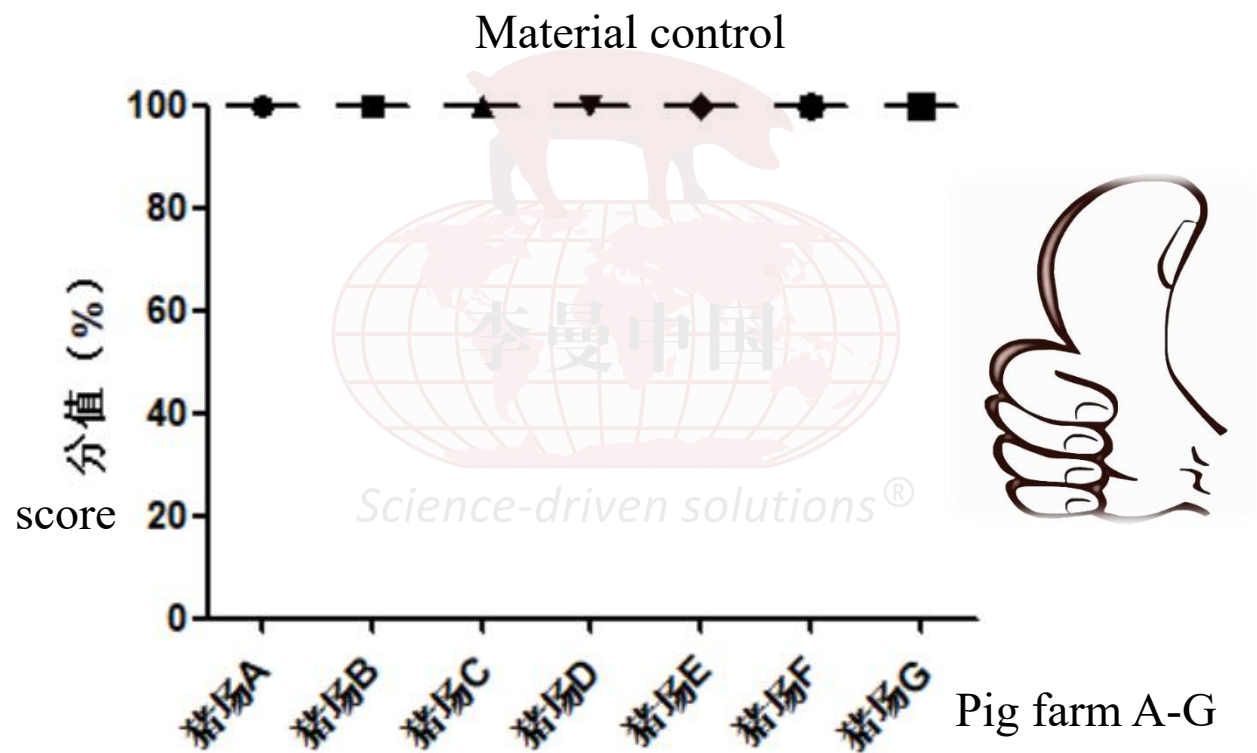
- Control of raw material purchases
- Whether controlled-release agents (virus inhibitors) are used to reduce virus load and survival time in feed.

Water:

- Inspection of the use of drinking water disinfectants
- Conduct regular water quality (physical and chemical) testing
- Bacterial cultures

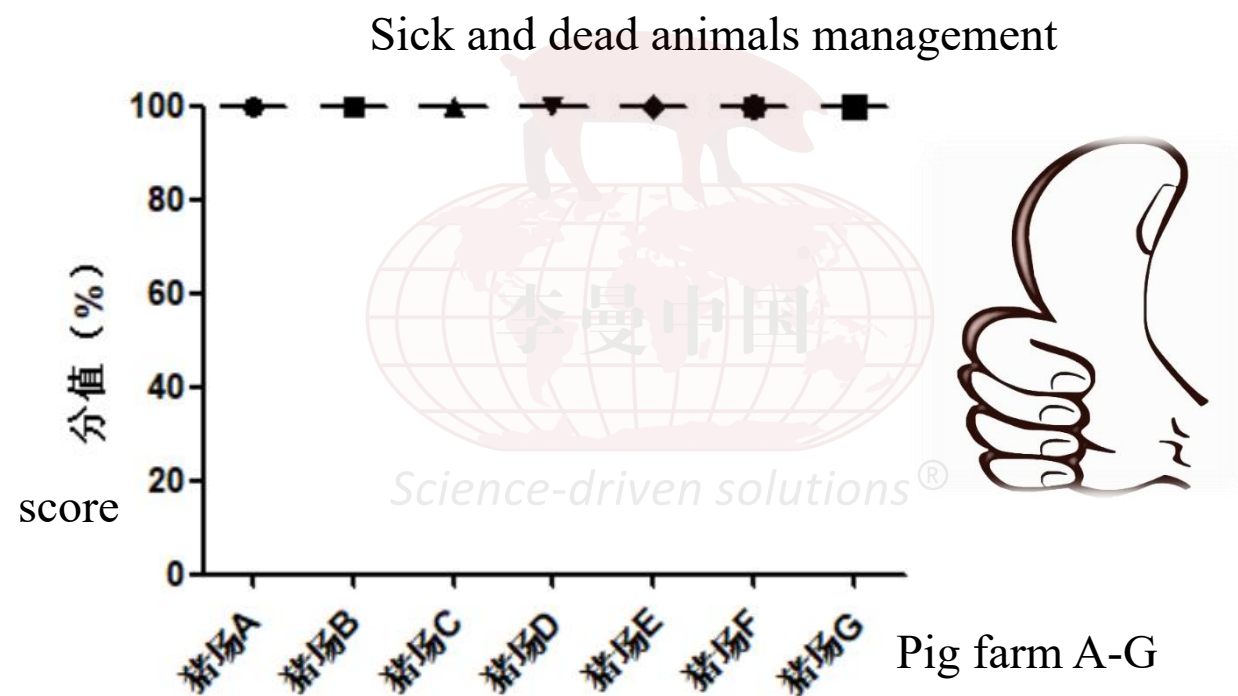
Analysis of audit results:

6. Material control score:



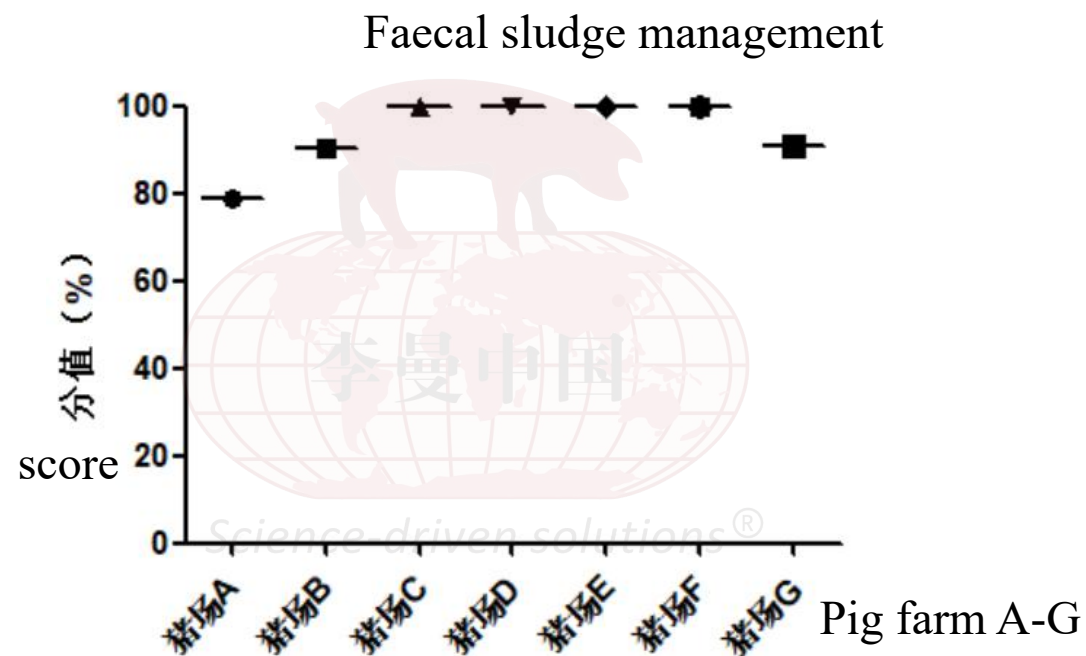
Analysis of audit results:

7. Sick and dead animals management score:



Analysis of audit results:

8. Faecal sludge management score:



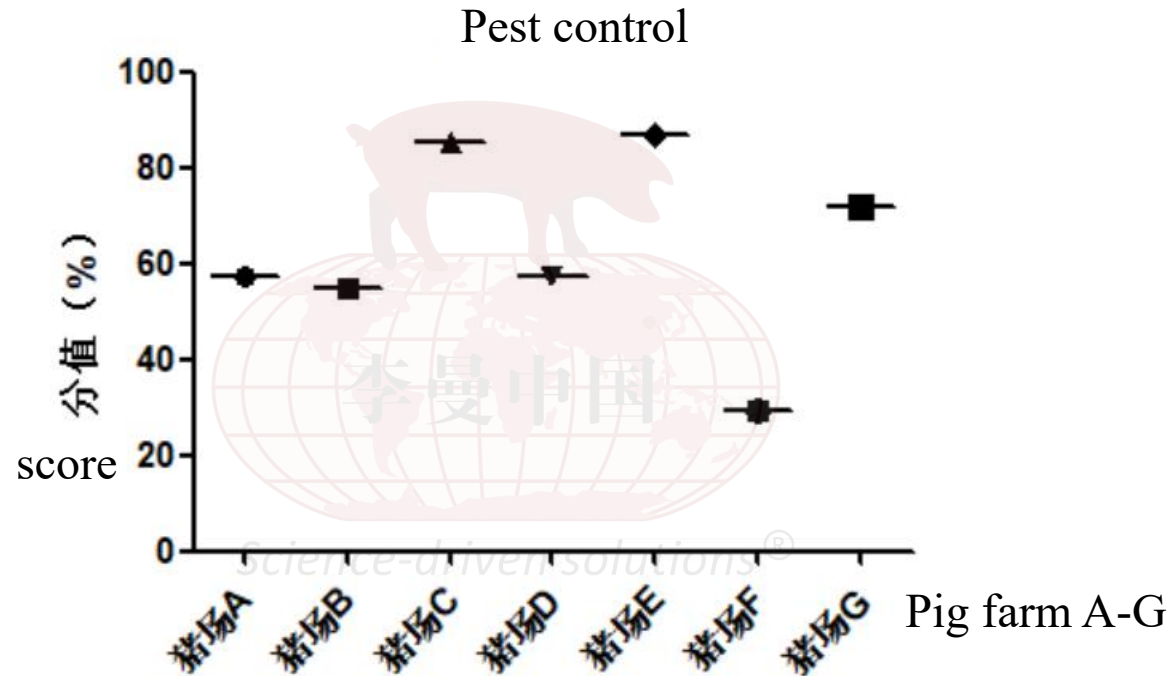
According to the audit, 85.71% (6/7) of the farms are well managed, but there are also farms with relatively significant risk vulnerabilities.

Problems in the audit process of faecal sludge management:

- Division of faecal sludge areas:
 - Divide faecal sludge areas into internal service area (staff isolation area)
 - There was no exclusive passway for faecal sludge
- External transport vehicles for faecal sludge:
 - Allow vehicles of external feces processing plant to the site for feces loading.
 - Inadequate cleaning and inspection of vehicles.
 - Inability to carry out cleaning and inspection on each vehicle.

Analysis of audit results

9. Pest control score:



Pest control was the item with the highest biosecurity risk vulnerability and the largest variation in assessment scores during the biosecurity review. It is also often the most easily overlooked problem in daily life.

Problems in the audit process of pest control:

■ Use and management of rodent traps and bait stations:

- Rodent traps and bait stations are in place, but without regular placement of rat poison and proper management.

■ Weed removal:

- In particular, pig farms in the south have more weeds, which is also a major hiding place for rats.

■ On-site wildlife control:

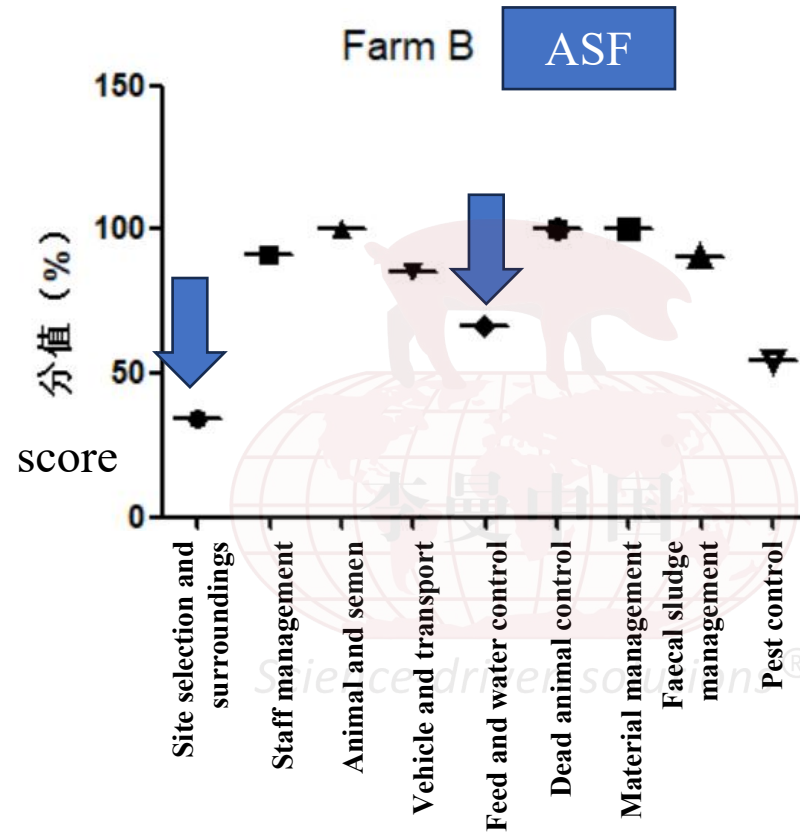
- Poorly fenced pig farms and poorly blocked drains can be gateways for wildlife to enter the sites.
- Harmless disposal area

Assess the medical history of 7 farms within 3 years:

Farm	Total score	Site selection score	PRRS	PED	ASF
Farm G	86.46%	78.20%	1	-	1
Farm F	81.19%	79.89%	-	-	-
Farm A	80.32%	91.47%	-	-	-
Farm C	79.39%	56.50%	2	-	-
Farm E	77.90%	66.78%	-	-	-
Farm D	75.77%	66.72%	1	-	3
Farm B	71.74%	34.60%	-	-	1

Note: Numbers represent the times of disease outbreaks within 3 years; “-” represents no outbreak of disease.

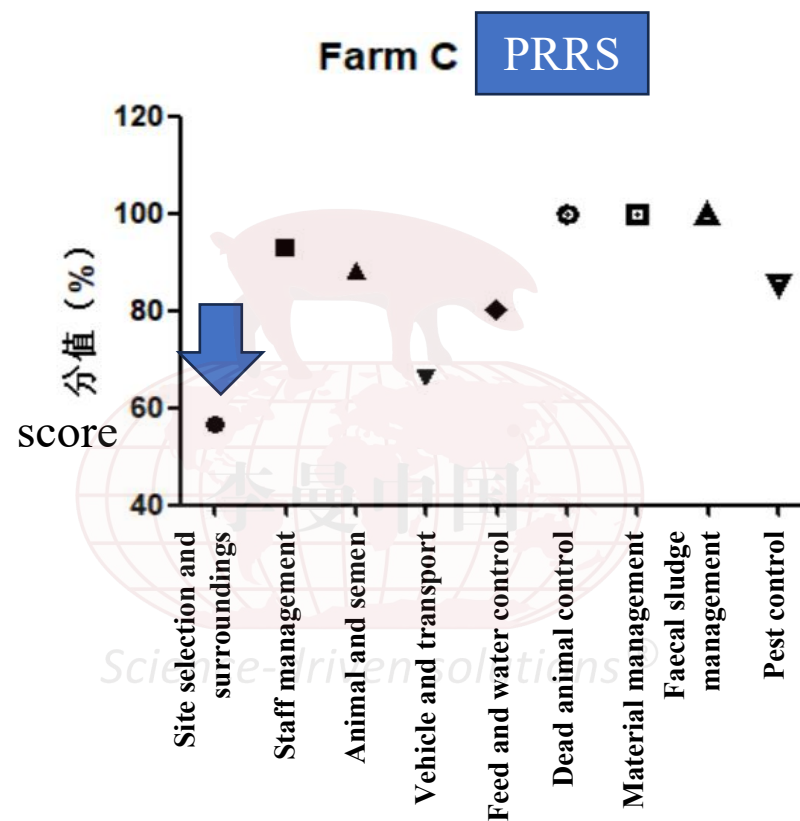
Analysis of the review results of farms with disease outbreaks:



Investigate the route of infection:

- Feed dissemination: ASFV nucleic acid was detected on the outer surface of container bags, on the inner surface of the doser, and on the inner surface of feeder in the feed bin.
- Aerosol dissemination: ASFV nucleic acids were detected in the crack of the door between the filter room and the outside and in the locking eye of the door connecting the feed bin with the filter room.

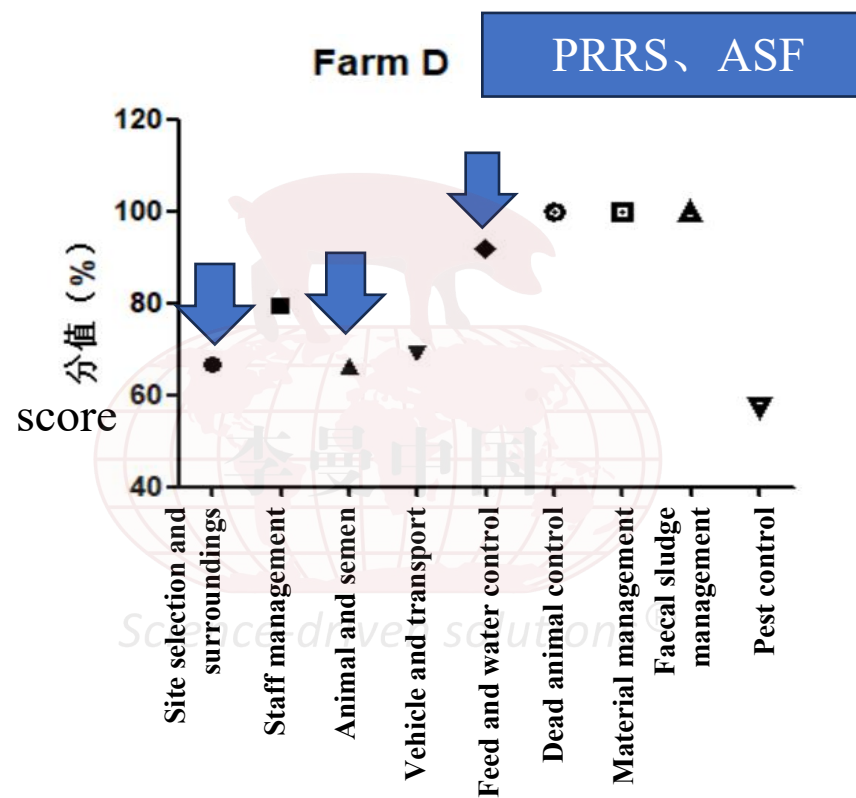
Analysis of the review results of farms with disease outbreaks:



Investigate the route of infection:

- Sequencing analyses were inconsistent with systemic strains and were identified as newly infected strains.
- Three finishing farms, which were about 2 kilometers from the farm, were infected and spread the virus to the farm C. (They shared roads and vehicles of finishing farms passed by the entrance to the Farm C)

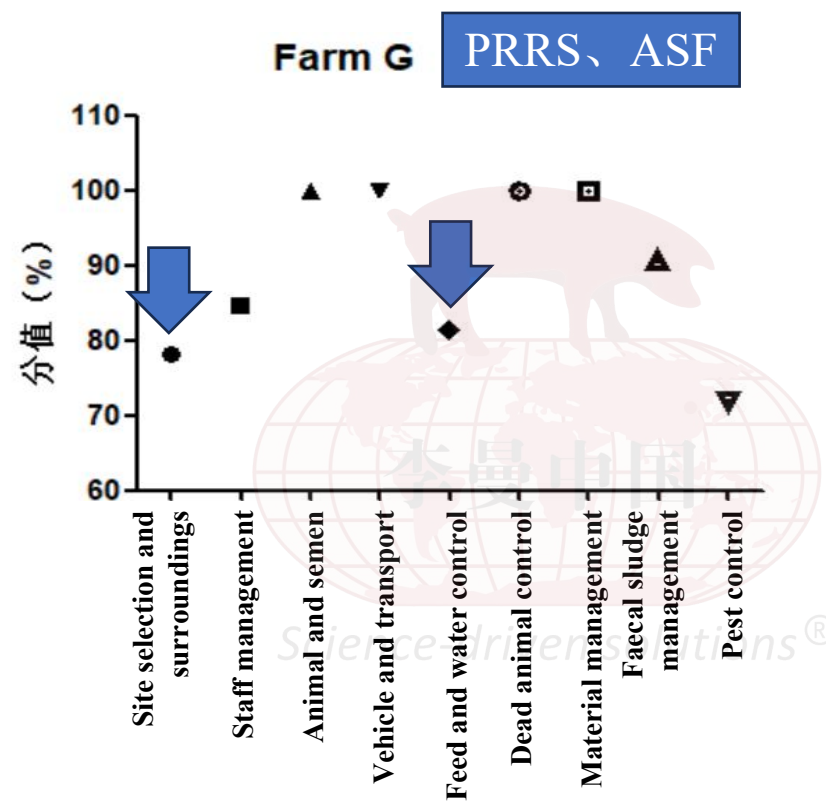
Analysis of the review results of farms with disease outbreaks:



Investigate the route of infection :

- Gilts with the virus were introduced to the population, which led to unstable PRRS status.
- Aerosol dissemination: ASFV Nucleic Acids was detected positive following the spring sandstorms in the North.
- Feed dissemination: The outbreak of the disease is relatively scattered and multiple pigs can be tested positive at the same time.

Analysis of the review results of farms with disease outbreaks:



Investigate the route of infection:

- **air filtration vulnerabilities:** The farm is an air-filtering farm. After the outbreak of PRRS, the filter efficiency was tested, which decreased rapidly to less than 80%. It was also found that there were filtering vulnerabilities in the filters. (There are gaps between the filter frames)
- **Feed contamination:** positive samples of feed dust were detected in the dispensers of the infected pigs.



Summary:

- Regular biosecurity reviews can help pig farms identify biosecurity management vulnerabilities, assess the accuracy of biosecurity operations, and correct operations that do not comply with biosecurity measures in a timely manner.
- According to the results of biosecurity audits, there are some biosecurity management vulnerabilities in every farming company. After the ASF outbreak, control of risk factors such as staff, materials, vehicles, pigs and semen, and disposal of dead pigs was relatively strict, but it is easy to neglect the control of other animals such as deratization, prevention of birds, cats, dogs, etc.
- The template used for this audit is the Topigs' Global Common Template, which doesn't allow for auditing of detailed operations in biosecurity management and requires on-site assessment by the auditors.



Summary:

- Pig enterprises can formulate their own biosecurity programs and design the audit content for internal biosecurity audits. The more detailed the review, the more problems may be reflected.
- Inferring the results of biosafety assessment from the analysis of infection routes after the outbreak of disease, we get to know that there is a correlation between the results of the traceability and the results of the biosecurity reviews, which indicates that the biosecurity vulnerabilities reflected in the course of this biosecurity audit are likely to be a significant factor in the outbreak of disease in the pig farms.

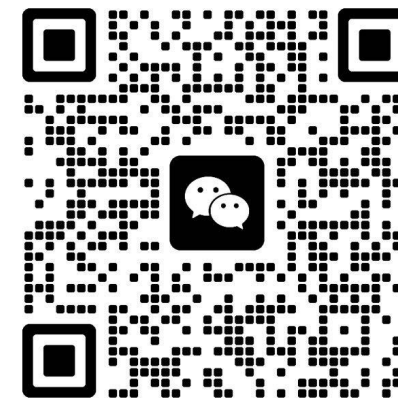


Thanks:

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王孝彬
山东 临沂



扫一扫上面的二维码图案，加我为朋友。



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