

Supplementary Table 1. The questionnaire for evaluating on-farm biosecurity level developed by authors based on the biosecurity assessment tool 'BioAsseT' developed by PRRS-Japan Elimination Team (P-JET) composed of a group of swine veterinarians (<http://site-pjet.com/>).

Questions	Answer Frame	Scoring															
I. Site																	
i. Site Condition																	
1) Choose the number of other farms located within 3 km radius from your farm.	<table border="1"> <tr><td>A</td><td>0</td></tr> <tr><td>B</td><td>1, 2</td></tr> <tr><td>C</td><td>3,4</td></tr> <tr><td>D</td><td>5 or more.</td></tr> </table>	A	0	B	1, 2	C	3,4	D	5 or more.	<table border="1"> <tr><td>4</td></tr> <tr><td>4/3*2=8/3</td></tr> <tr><td>4/3</td></tr> <tr><td>0</td></tr> </table>	4	4/3*2=8/3	4/3	0			
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3) Choose the distance from the nearest slaughterhouse.	<table border="1"> <tr><td>A</td><td>More than 10km radius.</td></tr> <tr><td>B</td><td>Less than 10 km radius but more than 4km radius.</td></tr> <tr><td>C</td><td>Less than 4km radius but more than 1km radius.</td></tr> <tr><td>D</td><td>Less than 1km radius.</td></tr> </table>	A	More than 10km radius.	B	Less than 10 km radius but more than 4km radius.	C	Less than 4km radius but more than 1km radius.	D	Less than 1km radius.	<table border="1"> <tr><td>4</td></tr> <tr><td>8/3</td></tr> <tr><td>4/3</td></tr> <tr><td>0</td></tr> </table>	4	8/3	4/3	0			
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II. External Biosecurity																	
ii. Replacement Gilts																	
5) Choose the introduction frequency of gilts.	<table border="1"> <tr><td>A</td><td>We don't introduce gilts from supplier (Complete closed flock.)</td></tr> <tr><td>B</td><td>We purchase introduce gilts annually (Self-rearing system.)</td></tr> <tr><td>C</td><td>We purchase gilts monthly.</td></tr> <tr><td>D</td><td>We purchase gilts weekly.</td></tr> </table>	A	We don't introduce gilts from supplier (Complete closed flock.)	B	We purchase introduce gilts annually (Self-rearing system.)	C	We purchase gilts monthly.	D	We purchase gilts weekly.	<table border="1"> <tr><td>4</td></tr> <tr><td>8/3</td></tr> <tr><td>4/3</td></tr> <tr><td>0</td></tr> </table>	4	8/3	4/3	0			
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6) Choose the acclimatization/quarantine period for gilts to herd flora before entering stables.	<table border="1"> <tr><td>A</td><td>More than 3 months.</td></tr> <tr><td>B</td><td>Less than 3 months but more than 2 months.</td></tr> <tr><td>C</td><td>Less than 2 months but more than 1 month.</td></tr> <tr><td>D</td><td>Less than 1 month.</td></tr> </table>	A	More than 3 months.	B	Less than 3 months but more than 2 months.	C	Less than 2 months but more than 1 month.	D	Less than 1 month.	<table border="1"> <tr><td>4</td></tr> <tr><td>8/3</td></tr> <tr><td>4/3</td></tr> <tr><td>0</td></tr> </table>	4	8/3	4/3	0			
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7) Choose the inspection methods you use for inspecting acclimatization.	<table border="1"> <tr><td>A</td><td>Both ELISA kit and PCR.</td></tr> <tr><td>B</td><td>Either ELISA kit or PCR.</td></tr> <tr><td>C</td><td>None.</td></tr> </table>	A	Both ELISA kit and PCR.	B	Either ELISA kit or PCR.	C	None.	<table border="1"> <tr><td>4</td></tr> <tr><td>2</td></tr> <tr><td>0</td></tr> </table>	4	2	0						
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9) Choose the hygienic requirements for clothing and shoes change.	<table border="1"> <tr><td>A</td><td>Disinfect shoes before entering and change to farm specific clothing and shoes.</td></tr> <tr><td>B</td><td>No disinfection of shoes before entering but change to farm specific clothing and shoes. Choose B if you use shoes cover.</td></tr> <tr><td>C</td><td>No requirements for clothing and shoes change.</td></tr> </table>	A	Disinfect shoes before entering and change to farm specific clothing and shoes.	B	No disinfection of shoes before entering but change to farm specific clothing and shoes. Choose B if you use shoes cover.	C	No requirements for clothing and shoes change.	<table border="1"> <tr><td>4</td></tr> <tr><td>2</td></tr> <tr><td>0</td></tr> </table>	4	2	0						
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iv. Transport Vehicles																	
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v. Manure & Carcass																	
14) Choose the status of collection storage for dead body.	<table border="1"> <tr><td>A</td><td>The transport vehicles drive to private collection storage settled outside of the sanitary area or use private incinerator to dispose dead body.</td></tr> <tr><td>B</td><td>The transport vehicle drive to shared collection storage outside of the sanitary areas.</td></tr> <tr><td>C</td><td>The transport vehicle drive into collection storage settled inside of the sanitary area no matter private use or shared without loading dead body from other farms.</td></tr> </table>	A	The transport vehicles drive to private collection storage settled outside of the sanitary area or use private incinerator to dispose dead body.	B	The transport vehicle drive to shared collection storage outside of the sanitary areas.	C	The transport vehicle drive into collection storage settled inside of the sanitary area no matter private use or shared without loading dead body from other farms.	<table border="1"> <tr><td>4</td></tr> <tr><td>3</td></tr> <tr><td>2</td></tr> </table>	4	3	2						
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	D	The transport vehicle drive into collection storage settled inside of the sanitary area no matter private use or shared, with loading dead body from other farms.	1
	E	Not applicable (N/A) to above statements.	0
15) Choose the status of transport vehicle used for carrying dead animals between pen and collection storage.	A	The transport vehicle are used privately for carrying dead animals to storage only.	4
	B	The transport vehicle are used privately but for multiple purpose.	8/3
	C	The transport vehicles are shared with other several farms but loaded individually.	4/3
	D	The transport vehicles are shared with other several farms and loaded jointly.	0
16) Choose the status of cleaning procedure for transport vehicles used to carry dead animals inside the farm.	A	The transport vehicles are washed and disinfected properly.	4
	B	No cleaning procedure is taken or unknown.	0
17) Choose the requirements for vehicle driver after transporting.	A	The driver is engaged in delivering only or is enforced one night down time (pig contact free period).	4
	B	The driver is enforced to have shower in before entering farm on the day.	8/3
	C	The driver is not enforced to have shower in but to change clothing and shoes.	4/3
	D	No requirements.	0
18) Choose the manure composting facility.	A	We have private composting facility and use private vehicle to transport manure.	4
	B	We share composting facility with others but use private vehicle to transport manure.	2
	C	We share both composting facility and vehicle to transport manure.	0
vi. Vermin Controls			
19) Choose the rodent control in your farm.	A	No trace of rodents are observed in our farm.	4
	B	Regular deratizations are made in our farm.	8/3
	C	Indeterminate deratizations are made in our farm.	4/3
	D	No deratizations are made despite the trace of rodents.	0
20) Choose the wild birds control in your farm.	A	Our farm is fully equipped with bird preventing net and overhauled regularly.	4
	B	Our farm is partly equipped with bird preventing net.	2
	C	No measurements against wild birds.	0
vii. Farm Contractors			
21) Choose the entrance requirements for farm contractors entering stables.	A	Contractors are obliged to have down time and shower in.	4
	B	Contractors are obliged to have down time and change clothing and shoes.	8/3
	C	Contractors are obliged to have down time but no requirements for clothing and shoes,	4/3
	D	No requirements nor entering record.	0
22) Choose the requirements for materials and tools to enter.	A	Fumigation is required or farm specific materials and tools are used.	4
	B	Disinfection other than fumigation is required.	2
	C	No requirements.	0
III.+B118:E195 Internal Biosecurity			
viii. Pen Layouts			
23) Choose the status of pen independence.	A	All the growth stages are independent by stables.	4
	B	All the growth stages are independent by pen with independent underfloor.	3
	C	All the growth stages are independent by crate with joint underfloor.	2
	D	Growth stages are mixed in the stables but partitioned by walls.	1
	E	Growth stages are mixed in the stables without physical separation.	0
24) Choose the status of site independence.	A	The sites are independent by production stages.	4
	B	All the production stages are gathered in the single site but settled in order of growth stages.	2
	C	All the production stages are gathered in the single site and settled randomly among growth stages.	0
ix. Pig-flows			
25) Choose the status of all-in all-out system at farrowing stage.	A	All-in all-out by each stable unit.	4
	B	All-in all-out by each pen unit.	8/3
	C	We have continuous flow in order of expected date of delivery.	4/3
	D	We have continuous flow and mixed without order.	0
26) Choose the status of all-in all-out system at weaning stage.	A	All-in all-out by each stable unit.	4
	B	All-in all-out by each pen unit.	8/3
	C	We have continuous flow in order of age.	4/3
	D	We have continuous flow and mixed without order.	0
27) Choose the status of all-in all-out system at fattening stage.	A	All-in all-out by each stable unit.	4
	B	All-in all-out by each pen unit.	8/3
	C	We have continuous flow in order of age.	4/3
	D	We have continuous flow and mixed without order.	0
28) Choose the status of all-in all-out system at quarantine period for gilts.	A	All-in all-out by each stable unit.	4
	B	All-in all-out by each pen unit.	8/3
	C	We have continuous flow in order of age.	4/3
	D	We have continuous flow and mixed without order.	0
29) Choose the status of isolation and culling of sick animals.	A	Both active isolation and culling are operated.	4
	B	Active isolation but inactive culling are operated.	2
	C	Both inactive isolation and culling are operated.	0
30) Choose the status of boomerang fattening pigs.	A	We completely all-out the fattening pigs.	4
	B	We have specific stable for boomerang pigs.	8/3
	C	We return to the stable with other batch without direct contact by settling specific pen for boomerang pigs.	4/3

D	We return to the stable with other batch and mixed with the different litters.	0
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x. Cleaning & Disinfection

31) Choose the status of cleaning at farrowing pen.	A	Organic substances are all washed out and counter checked by supervisor.	4
	B	Organic substances are all washed out but no counter check by supervisor.	8/3
	C	Organic substances are often remain behind the facilities.	4/3
	D	We do not regularly wash farrowing pen.	0
32) Choose the status of cleaning at weaning pen.	A	Organic substances are all washed out and counter checked by supervisor.	4
	B	Organic substances are all washed out but no counter check by supervisor.	8/3
	C	Organic substances are often remain behind the facilities.	4/3
	D	We do not regularly wash weaning pen.	0
33) Choose the status of cleaning at fattening pen.	A	Organic substances are all washed out and counter checked by supervisor.	4
	B	Organic substances are all washed out but no counter check by supervisor.	8/3
	C	Organic substances are often remain behind the facilities.	4/3
	D	We do not regularly wash fattening pen.	0
34) Choose the status of disinfection procedure at farrowing pen.	A	We use aldehydes, hypochlorite or foam solution of strong-alkaline benzalkonium chloride.	4
	B	We use other solutions mentioned above.	8/3
	C	We rarely follow the instructions of disinfectant dosage	4/3
	D	We use no disinfectant.	0
35) Choose the drying period for farrowing pen.	A	More than 1 week.	4
	B	Less than 1 week but recharge sows after confirming drying state.	8/3
	C	Less than 1 week and recharge sows without confirming drying state.	4/3
	D	Recharge sows at the same day of discharge or recharge without drying.	0
36) Choose the status of disinfection procedure at weaning pen.	A	We use aldehydes, hypochlorite or foam solution of strong-alkaline benzalkonium chloride.	4
	B	We use other solutions mentioned above.	8/3
	C	We rarely follow the instructions of disinfectant dosage.	4/3
	D	We use no disinfectant.	0
37) Choose the drying period for weaning pen.	A	More than 1 week.	4
	B	Less than 1 week but recharge weaners after confirming drying state.	8/3
	C	Less than 1 week and recharge weaners without confirming drying state.	4/3
	D	Recharge weaners at the same day of discharge or recharge without drying.	0
38) Choose the status of disinfection procedure at fattening pen.	A	We use aldehydes, hypochlorite or foam solution of strong-alkaline benzalkonium chloride.	4
	B	We use other solutions mentioned above.	8/3
	C	We rarely follow the instructions of disinfectant dosage	4/3
	D	We use no disinfectant.	0
39) Choose the drying period for fattening pen.	A	More than 1 week.	4
	B	Less than 1 week but recharge fattening pig after confirming drying state.	8/3
	C	Less than 1 week and recharge fattening pig without confirming drying state.	4/3
	D	Recharge fattening pigs at the same day of discharge or recharge without drying.	0

xi. Employee

40) Choose the frequency of changing shoes.	A	Change every pen.	4
	B	Change every stable.	8/3
	C	Change every growth stage.	4/3
	D	No exchange.	0
41) Choose the frequency of changing clothing and globes.	A	Change every pen.	4
	B	Change every stable.	8/3
	C	Change every growth stage.	4/3
	D	No exchange.	0

xii. Injection Needles

42) Choose the frequency of changing injection needles for sows.	A	One for one sow.	4
	B	We use jet injector.	2
	C	No exchange.	0
43) Choose the frequency of changing injection needles for weaners.	A	We use jet injector or at least one for one litter.	4
	B	One for single pen or single batch.	2
	C	No exchange.	0
44) Choose the frequency of changing injection needles for piglets.	A	We use jet injector or at least one for less than 10 piglets in the single pen.	4
	B	One for more than 10 piglets in the single pen.	8/3
	C	One for single batch.	4/3
	D	No exchange.	0

xiii. Delivery Stalls

45) Choose the status of disinfection procedure for mutilation materials	A	Disinfect per piglet.	4
	B	Disinfect per single littler.	8/3
	C	Disinfect per single batch.	4/3
	D	No disinfection.	0
46) Choose the status of cross fostering. * Cross fostering : sows with less liveborn piglets than teats can receive the excessed piglets from other sows.	A	Execute at minimum level after adequate colostrum intake.	4
	B	Execute actively after adequate colostrum intake.	2

	<input type="checkbox"/> C	Execute before giving adequate colostrum intake.	0
47) Choose the status of operating nurse sows. * Nurse sows: sows wean her own piglets to give extra teat capacity to excess piglets.	<input type="checkbox"/> A	Execute at minimum level after adequate colostrum intake.	4
	<input type="checkbox"/> B	Execute actively after adequate colostrum intake.	2
	<input type="checkbox"/> C	Execute before giving adequate colostrum intake.	0
48) Choose the status of caring runt piglets.	<input type="checkbox"/> A	Operate active culling.	4
	<input type="checkbox"/> B	No culling but use fostering technic or early weaning.	8/3
	<input type="checkbox"/> C	No fostering and wean as usual.	4/3
	<input type="checkbox"/> D	Pass to the nursing sow and mix with healthy piglets or isolate with excessed weaning age at farrowing pen.	0