Specific Pathogen Free (SPF) Organism-Information Sheet

Key points

- *SPF animals are designated to be free from specified pathogens. They have been raised in biosecure facilities and their health status is monitored on an ongoing basis using sensitive diagnostic methods.*
- *The SPF status simply provides an assurance to the buyer that the stock is not infected with the specified pathogens at the time of purchase. The SPF status is lost when animals are removed from biosecure facilities.*
- *SPF animals are not disease free nor are they disease resistant. They may well carry other pathogens for which their health status has not been assessed.*
- *Buyers should be sure to obtain the list of pathogens for which a stock is specified to be free, and ask for details about the date of the most recent health screening, the health surveillance program used to monitor stocks, the diagnostic methods used and disease history of the SPF facility.*

What is SPF?

SPF animals are special stock of animals that are kept in specific pathogen free facilities under rigorous monitoring system, which are subjected to sensitive and accurate diagnostic methods. The animals are repeatedly bred under controlled conditions to maintain their freedom from specific pathogens and the SPF designation itself is tested on a regular basis over an extended period of time. The SPF animals are **not** innately resistant to the specified pathogens or infections, although they can possibly be developed as specific pathogen resistant (SPR) species. They are not produced to provide either superior genetic stock or improved culturing attributes such as faster-growth. However, these characteristics can be incorporated into SPF stock to increase their commercial value. The SPF status of stock animals is lost once the animals are removed from the designated facility even if the animals are not infected or develop any other disease symptoms. The SPF animals may be referred to as “high health” stock once they are transferred to other well-established unit with history of disease surveillance.

SPF for which pathogens?

The specific list of pathogens the SPF stock are free from varies between suppliers. Principally, those pathogens must be a significant threat to the industry and possibly to international trade. All the OIE listed pathogens are normally considered. The pathogens affecting any life cycle stage of animal should be included. These pathogens must be detectable with reliable diagnostic methods that can evaluate the animal health status. Moreover, they must be physically excluded from the animal culture facility.

Duration of SPF?

SPF status will be lost once animals are removed from the high biosecure facility, where it is confined for the SPF designation. The SPF status is not heritably passed from parent to offspring.

What people should look for when they buy SPF?

The buyers should get the following information when they purchase SPF stock.

- A defined specific pathogen list for the stock
- diagnostic/detection methods used for pathogen screening
- date of the most recent screening performed, and by whom?
- surveillance program used for monitoring the stocks
- disease history of the SPF facility

What are the advantages?

SPF animals offer an advantage to a country introducing a species for the first time as it offers some assurance that the imported animals will not introduce the listed pathogens to native species. However, SPF stocks may harbor other (non-specified) pathogens, and this should be taken into an account as it can pose a risk when the animals are under stress.

With regard to shrimp culture, biosecurity systems are adopted to overcome a threat of disease outbreaks. The main concepts of biosecurity systems are to exclude pathogens and aid eradication if they occur. SPF stock is one of the major components considered in any biosecurity system, since the specific pathogen can be eliminated and contamination minimized.

SPF animals are extremely useful for basic and applied science research especially to immunological studies and vaccine trials since the listed interfering pathogens can be ruled out. The SPF animals are also essential for other bioassay; for instance a study of shrimp viral diseases, where the shrimp cell line is not available, the pathogen free animals are certainly needed for bioassay study.

Are there any risks?

The major concern of SPF stock is the potential problems caused by inbreeding. SPF development is reliant on inbreeding of animals to maintain consistent production. Such a production system inevitably faces the problem of genetic deterioration. This may pose problems such as reduction in disease tolerance, growth characteristics, and other developmental abnormalities of stock animals.

Lacking natural immunity could be another risk to be considered. As the SPF animals are cultured under hygienic condition with minimal contact to normal micro flora, their acquired immunity is rather low. Thus, SPF stock may not perform well under non-biosecure or outdoor open culture operations.

SPF animals are only free from tested specific pathogens, however the hidden/unknown pathogen are usually overlooked. Mutation of specific pathogens commonly occurs especially in viral diseases. This means that although the monitoring program is active, the pathogenic agent may be missed out. This hidden risk can consequently pose a threat to the health status of the animal.