CUARENTAGRI

INVESTIGACIÓN
IDENTIFICACIÓN DE PLAGAS
FORMACIÓN

FASE 2: DISPERSIÓN

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EPPO EXPRES PRA

Etapa 2: Evaluación del Riesgo de Plagas

11. Dispersión en el área PRA

11. Spread in the PRA area

- *Natural spread*
- *Human assisted spread*

Briefly describe each mode of spread (e.g. natural flight of invertebrate pests, wind dispersal, carried within plants or plant products, carried with traded commodities), and indicate the rate or distance of spread.

If possible consider how long it would take for the pest to spread widely within the area of potential establishment if no phytosanitary measures are taken. If no specific data are available, compare with similar organisms.

Rating of the magnitude of spread	*Low* ☐	*Moderate* ☐	*High* ☐
Rating of uncertainty	*Low* ☐	*Moderate* ☐	*High* ☐

Actualmente, en EPPO, está utilizando la valoración de 5 niveles en lugar de la de 3 niveles del esquema express.

Rating of the magnitude of impact in the current area of distribution	*Very low* ☐	*Low* ☐	*Moderate* ☐	*High* ☐	*Very high* ☐
Rating of uncertainty			*Low* ☐	*Moderate* ☐	*High* ☐

Suggested subheadings

11.1. Natural spread

11.2. Human assisted spread

11. Dispersión en el área PRA

La dispersión se define como la expansión de la distribución geográfica de una plaga dentro de un área.

El potencial de propagación es un elemento importante para determinar la rapidez con la que se produce el impacto y la facilidad con que se puede contener una plaga.

Algunas plagas pueden no tener efectos nocivos en las plantas inmediatamente después de su establecimiento y, en particular, pueden propagarse solo después de cierto tiempo.

11. Dispersión en el área PRA

En esta sección se debe describir brevemente cada modo de propagación es decir lo que se puede considerar dispersión natural (p. ej., vuelo natural de plagas de invertebrados, dispersión por el viento o el agua, transporte mediante animales)

Diferente de la que se consideraría como dispersión asistida por humanos (transportado dentro de plantas o productos vegetales, transportado con otros productos comercializados), e indicar la velocidad o la distancia de propagación (según los datos disponibles).

Si es posible, el evaluador debe considerar cuánto tiempo tardará la plaga en propagarse ampliamente dentro del área de establecimiento potencial si no se toman medidas fitosanitarias.

Si no se dispone de datos específicos, se pueden utilizar comparaciones con organismos similares.

Guía de evaluación cuantitativa de plagas. Dispersión

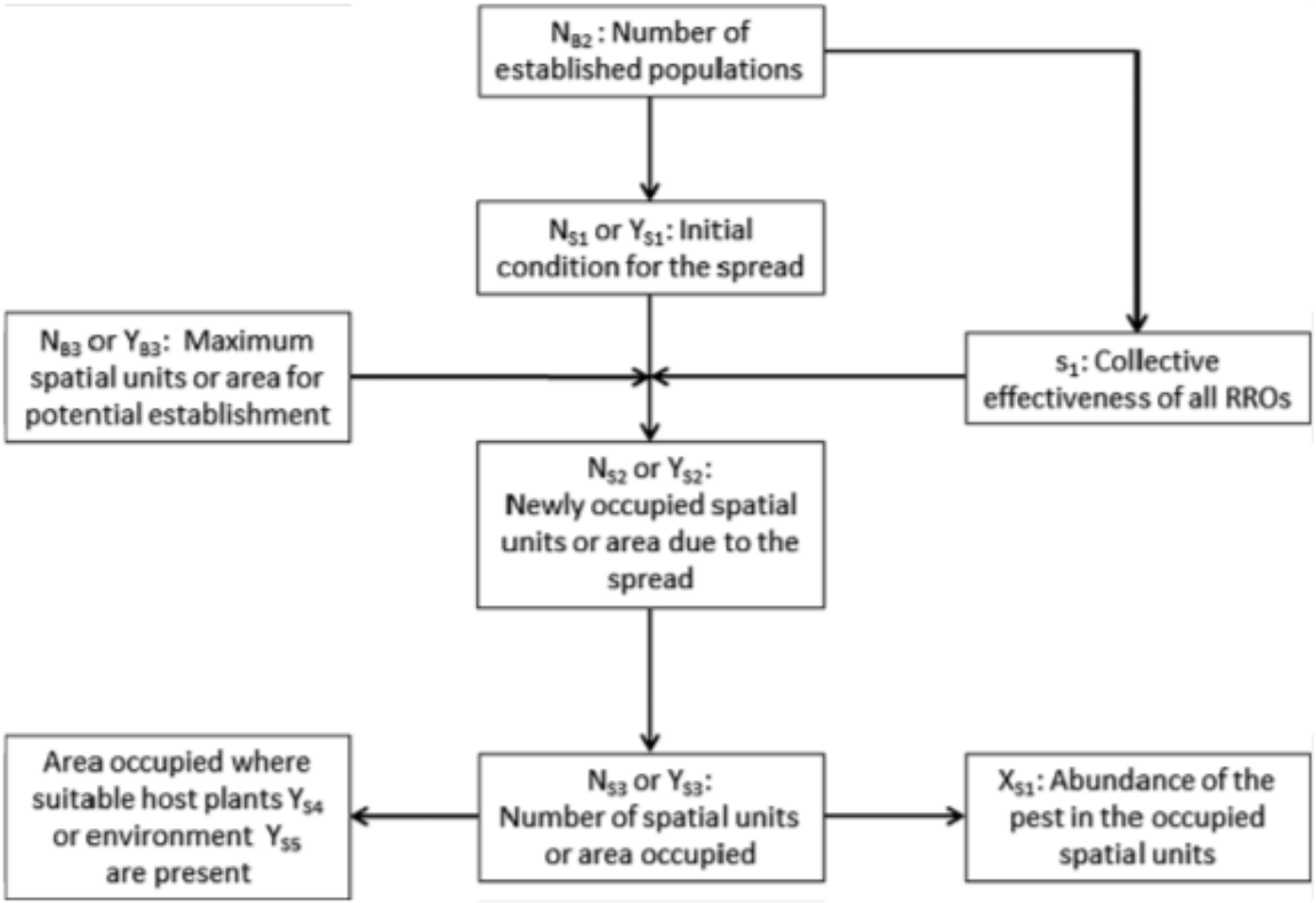

Figure 5: Information flow in a conceptual model of the spread step based on occupancy of spatial units, such as NUTS regions

ESQUEMA PM 5/3

1.30 How likely is the pest to spread rapidly in the PRA area by natural means?

Spread can be described as **distance covered per unit time** (e.g. 50 m /year) or in **increasing area occupied** (e.g. km^2) **over time.**

Bactrocera dorsalis is considered **a strong flier.** Immature adults are able to disperse over long distances to find fresh food resources and breeding substrates (Fletcher, 1987; Steiner, 1957).

Large numbers of flies usually move into fruiting areas when fruit begins to ripen, and they may leave when the fruiting season ends.

As long as sufficient food sources are available in the nearby surroundings one would expect limited dispersal, so that flies remain in the area where they emerged to lay the next generation of eggs.

Based on expert knowledge elicitation, EFSA (2019) estimated that the **maximum distance of natural spread of *B. dorsalis* in one year is 7 km (with a 95% uncertainty range of 1.4–34 km).**

ESQUEMA PM 5/3

1.30 How likely is the pest to spread rapidly in the PRA area by natural means?

This scenario considers **2–3 generations per year with 3–4 km spread per generation.**

For instance, in a mark-and-recapture experiment in Hawaii, **30 adults were captured at distances of over 2 km, ranging from 2.63 to 11.39 km** (Froerer et al., 2010). Steiner (1957) found a dispersal radius of B. dorsalis of up to 37 after fruit harvests in Hawaii, and Zhu and Qiu (1989) reported that ***B. dorsalis*** **could cover the 27 km distance** from Taiwan to Ryukyu

Since 2003 the species has spread to 32 African countries. *B. dorsalis* was not detected during surveys performed in Kenya and Tanzania in 2000, **suggesting that it was not established in 2000**, or only present in very low numbers. Its first place of discovery (i.e. Kenya) should not be assumed to be its point of entry into Africa, as it may have been overlooked in some areas.
B. dorsalis **may have spread about 6500 km in about 7 years** from the Eastern African coast, to the Western one, but it may also be the result of multiple introductions at different geographical locations and man induced spread (Khamis *et al*., 2009).
The species was, initially, named "*invadens*" on the basis of its rapid invasion of the African continent.

ESQUEMA PM 5/3

1.30 How likely is the pest to spread rapidly in the PRA area by natural means?

***Bactrocera* species can be attracted to Methyl Eugenol up to 0.8 km away from suitable hosts** (White and Elson-Harris, 1994) which suggests that *B. invadens* would be able to fly at least between adjacent fruit crops.

Studies have shown that sterilized ***B. zonata* were recaptured til 40 km from the point of their release** (Qureshi *et al.,* 1975) **The flying ability of *B. dorsalis* is supposed to be higher than *Ceratitis cosyra* and *C. capitata* in Africa** (JF Vayssières, pers. com., 2009)

The continuous presence of hosts in the endangered area facilitates the spread.

B. dorsalis might not find major hosts in certain parts of the Macaronesian region, and females would have to look for other hosts, **enhancing the spread of the species.**

1.31 How likely is the pest to spread rapidly in the PRA area by human assistance?

B. Dorsalis could be spread by human assistance predominantly through **the movement of contaminated fruits of host plants.** Trade routes between North Africa and Macaronesian Region exists for hosts produced in North Africa.

There is also movement of **people potentially carrying infested fruits**.

LIKELY?

ESQUEMA PM 5/3

1.32 Based on biological characteristics, how likely is it that the pest will not be contained within the PRA area?

Containment measures might be successful **only if an eradication program is immediately started** after detection the first outbreak.

Effective tools exist for early detection with **Methyl Eugenol.** There are available tools to contain the populations such as suppression measures and internal quarantine, but implementation would be costly.

Hosts plants are available, **and polyphagy** would make the **containment more difficult.**

Bactrocera spp. have a **highly-developed flying ability (0.8 km away** from likely hosts according to White and Elson-Harris, 1994) which allows it to spread easily and also to re-infest the orchards quickly after treatment (Vayssières *et al*., 2008). The reproductive strategy of the pest is very effective.

Man induced spread through the transport of fruits would be very **difficult to control**.

LIKELY, MEDIUM

Evaluación de la capacidad de dispersión

CAPACIDAD DE DISPERSIÓN			
PREGUNTA		PROBABILIDAD	INCERTIDUMBRE
1.30	Natural		
1.31	Ayuda humana		
1.32	¿Contenible?		
1.32c	CONCLUSION		

Evaluación de la capacidad de dispersión

CAPACIDAD DE DISPERSIÓN			
PREGUNTA		PROBABILIDAD	INCERTIDUMBRE
1.30	Natural	Alta	Baja
1.31	Ayuda humana	Alta	Baja
1.32	¿Contenible?	Alta	Baja
1.32c	CONCLUSION	ALTA	BAJA

Evaluación de la capacidad de dispersión

CAPACIDAD DE DISPERSIÓN			
PREGUNTA		**PROBABILIDAD**	**INCERTIDUMBRE**
1.30	Natural	Alta	Baja
1.31	Ayuda humana	Alta	Baja
1.32	¿Contenible?	Alta	Baja

1.32c	**CONCLUSION**	**ALTA**	**BAJA**

1.32c The overall probability of spread should be described.

Considering the situation in Africa, the probability of spread of the pest is **high**, and the uncertainty is **low**

1.33A Conclusion on the probability of introduction and spread. (Your conclusions from the previous modules will appear in the box below.)

The probability of establishment of *B. dorsalis* is **high** as:

- many cultivated hosts are available
- Indeed, the species could develop up to 5 generations
- The tolerances of the species to cold temperatures, as well as to dry conditions remain the 2 major uncertainties. The species could adapt to new conditions and have a wider distribution than the one described above.
- there are few active ingredients available to control tephritids.
- eradication of the pest (outdoors) is very difficult
- *B. dorsalis*, as most tephritids, is characterized by a high fecundity ratio, fast life cycle.

CONCLUSIÓN PROBABILIDAD DE DISPERSIÓN

		PROBABILIDAD	INCERTIDUMBRE
1.33a	CONCLUSION GENERAL	ALTA	BAJA

GRADO DE AVANCE DE LA DISPERSIÓN

Una vez determinada que la capacidad de dispersión se estima alta con baja incertidumbre es necesario valorar el tiempo de reacción que permitiría la plaga:

Estimar tiempo para que alcance su máxima capacidad de dispersión

En principio podrían ser toda la parte del territorio donde existen especies hospedantes

Determinar la proporción de área invadida en 5 años

Dado la limitada extensión de las islas y la experiencia con otras introducciones de plagas, es razonable pensar que en ese periodo todo el área en riesgo de la isla estaría invadida

GRADO DE AVANCE DE LA DISPERSIÓN

No obstante, se podrían usar modelos de dispersión para calcular los parámetros anteriores

1.33A Conclusion on the probability of introduction and spread.

The uncertainty on the establishment of *B. invadens* in the region **is medium???**

Considering the observations in Africa and the particular situation in the endangered area, the probability of spread of the pest is high, and the uncertainty is low.

The overall probability of entry is **high**, with a **low uncertainty.**

1.33b Based on the answers to questions 1.15 to 1.32 identify the part of the PRA area where presence of host plants or suitable habitats and ecological factors favour the establishment and spread of the pest to define the endangered area.

Todo excepto zonas altas y posiblemente las islas con baja pluviometría donde no haya plantas hospedantes

DISCUTIR

FUSARIUM OXYSPORIUM F. SP. CUBENSE TR4

Evaluación de la capacidad de dispersión

TR4			
CAPACIDAD DE DISPERSIÓN			
PREGUNTA	PROBABILIDAD	INCERTIDUMBRE	COMENTARIO
1.30 Natural			Se mueve poco por si mismo Sin embargo, muchos mecanismos de dispersión
1.31 Ayuda humana			Plantas y movimiento de suelo. Alta dispersión e invasión nuevas zonas
1.32 ¿Contenible?			Peor si agua contaminada
1.32c CONCLUSION			

Evaluación de la capacidad de dispersión

TR4			
CAPACIDAD DE DISPERSIÓN			
PREGUNTA	PROBABILIDAD	INCERTIDUMBRE	COMENTARIO
1.30 Natural	Media	Baja	Se mueve poco por si mismo Sin embargo, muchos mecanismos de dispersión
1.31 Ayuda humana	Alta	Baja	Plantas y movimiento de suelo. Alta dispersión e invasión nuevas zonas
1.32 ¿Contenible?	Alta	Media	Peor si agua contaminada

1.32c	CONCLUSION	MEDIA ALTA	BAJA	

Evaluación de la capacidad de dispersión

TR4				
CAPACIDAD DE DISPERSIÓN				
PREGUNTA		PROBABILIDAD	INCERTIDUMBRE	COMENTARIO
1.30	Natural	Media	Baja	Se mueve poco por si mismo Sin embargo, muchos mecanismos de dispersión
1.31	Ayuda humana	Alta	Baja	Plantas y movimiento de suelo. Alta dispersión e invasión nuevas zonas
1.32	¿Contenible?	Alta	Media	Peor si agua contaminada
1.32c	CONCLUSION	MEDIA ALTA	BAJA	
			PROBABILIDAD	INCERTIDUMBRE
		CONCLUSION GENERAL	ALTA	BAJA

Estimar tiempo para que alcance su máxima capacidad de dispersión

Determinar la proporción de área invadida en 5 años

1.33A Conclusion on the probability of introduction and spread.

The uncertainty on the establishment of *TR4* in the region **is Low**

The probability of spread of the pest depends on the human action and is considered **low** in absence of it and **high** otherwise. In both cases uncertainty is **low.**

The overall probability of entry is **high**, with a **low uncertainty.**

ESQUEMA PM 5/3

1.33b Based on the answers to questions 1.15 to 1.32 identify the part of the PRA area where presence of host plants or suitable habitats and ecological factors favour the establishment and spread of the pest to define the endangered area.

Todas las zonas de cultivo de platanera

DISCUTIR

Muchas gracias