Funciones de Laboratorios de Cuarantena en CBC

1. **Soporte para envios de enemigos naturales del extranjero**
2. **Establecimiento de colonias de agentes nuevos**
3. **Determinar la biología y rango de hospederos de agentes nuevos**
4. **Desarrollar peticiones para liberaciones en el ambiente de agentes nuevos**
5. **Apoyar liberaciones para establecimiento en el campo de agentes nuevos**

Agentes colectados en el extranjero son enviados para servicios de envío a laboratorios de cuarentena

Soporte por envios

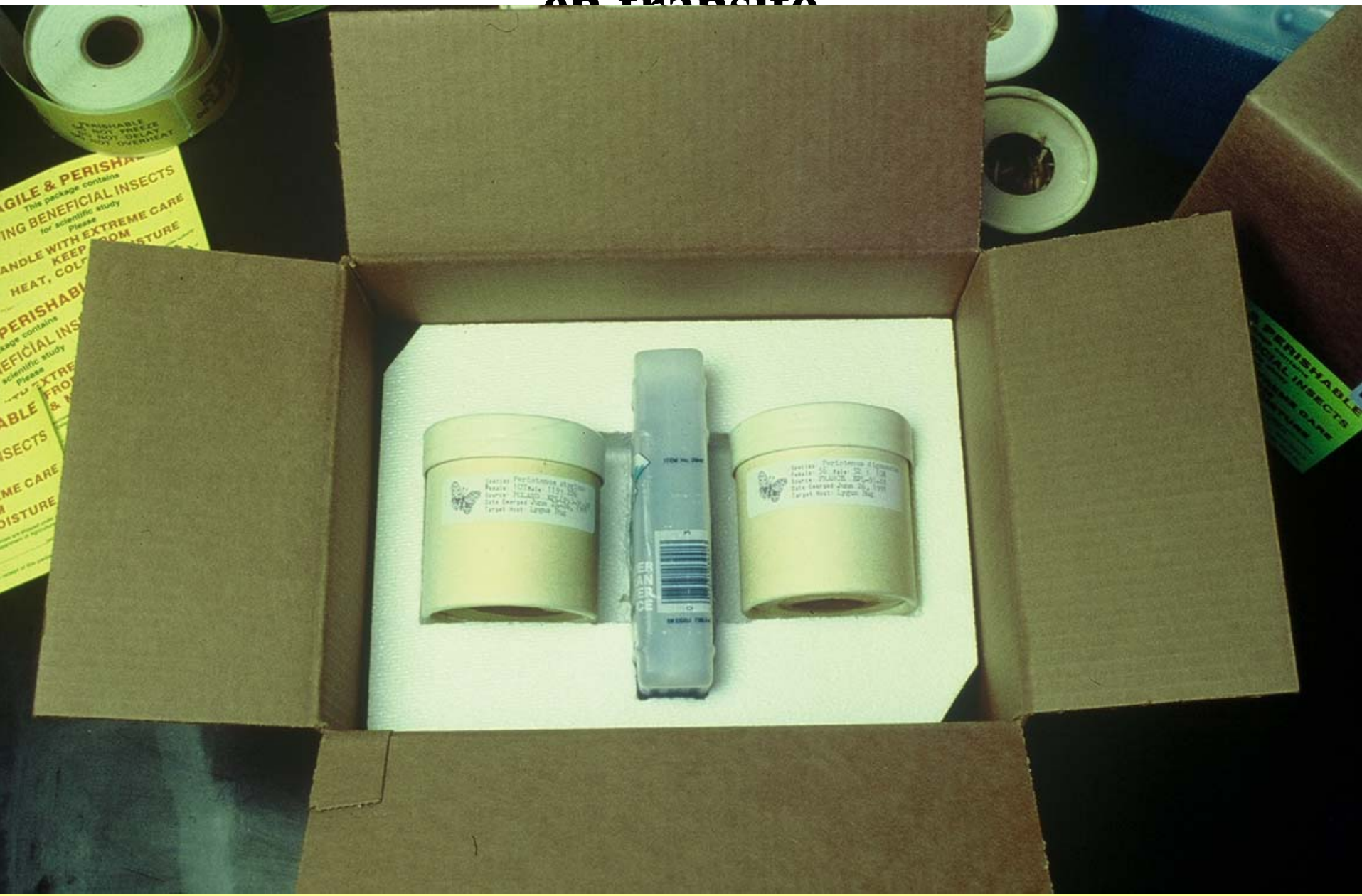
Evitae perdidas de material requiere (1) rapidez en el envío, (2) prevención de calor o sequía en los paquetes, y (3) buenos conocimientos de las reglas de importación nacional

Todas las agentes de CBC importados deben llegar primero a un laboratorio de cuarentena oficial

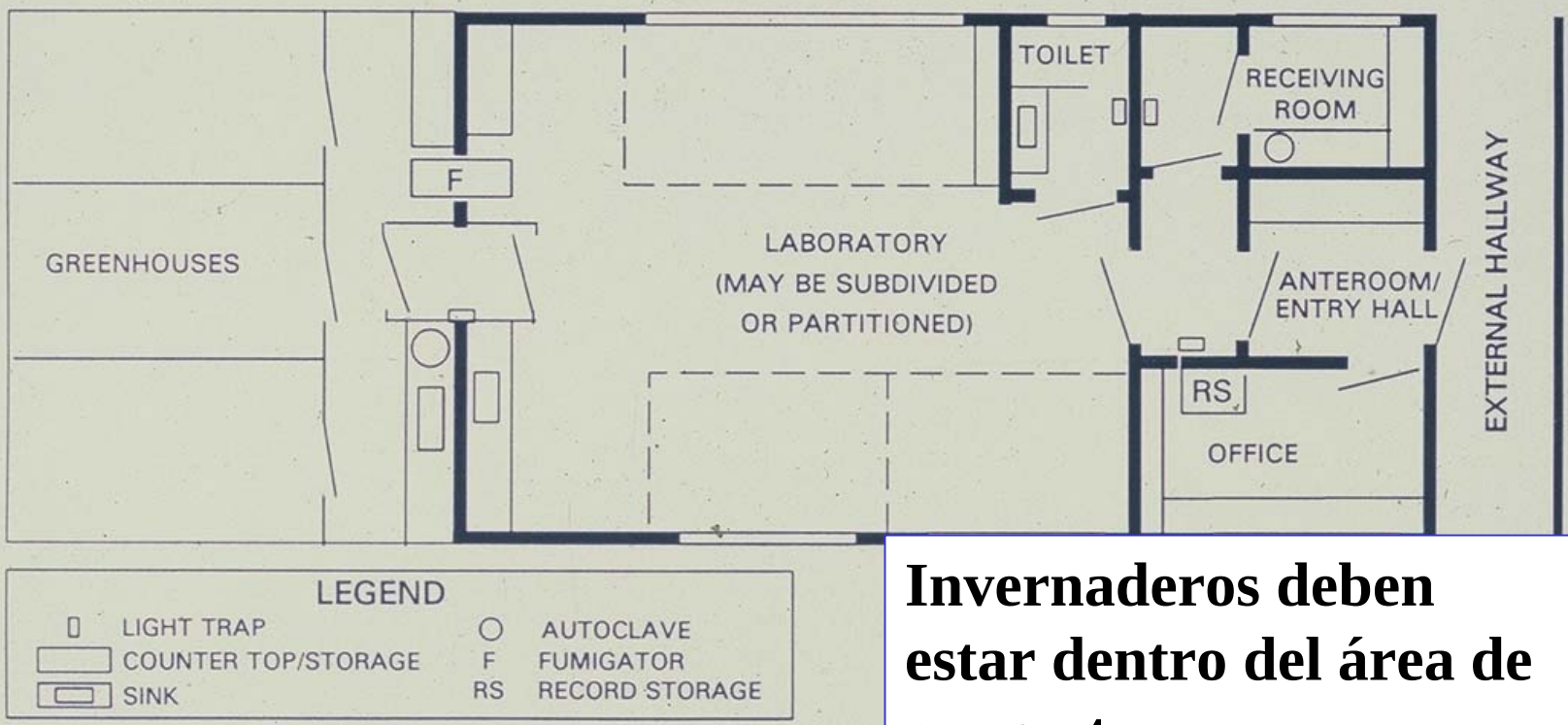
Abriendo paquetes

1. **Examinar el contenido y buscar frascos rotos**
2. **Examinar todo para detectar organismos no-deseados**
3. **Poner los agentes en jaulas con comida y agua**
4. **Destruir los materiales restantes en un autoclave o horno**

El hielo artificial es útil para bajar la temperatura en transito



Un laboratorio de cuarentena es una “caja dentro de una caja.” También hay reglas de manejo estrictas y un jefe de manejo



Invernaderos deben estar dentro del área de cuarentena

Fig. 9.1. (a) Layout of a quarantine facility includes an a… quarantine hallway and the external hallway, and an airlock separating the hallway from a primary receiving room where packages are first opened upon receipt. Additional rearing rooms may be included in the quarantine suite (after Fisher 1978). (b) Photograph of an existing quarantine building.

Preparando peticiones para liberaciones de agentes nuevos

Agentes de CBC/malezas

Deben demonstrar que el agente tiene un rango de hospederos que implica poco riesgo para plantas nativas o las exoticas que son economicamente importantes (TAG en los EU)

Preparando peticiones para liberaciones de agentes nuevos

Agentes de CBC/insectos

-Deben preparar una evaluación de impacto ambiental (EA)

-En los EU, APHIS debe determinar que el agente no es un riesgo para plantas

-Hay que cumplir con las leyes de proteción de animales y plantas en peligro

- Hay que cumplir con obligaciones de proteción del ambiente (NEPA)

¿Cuales son las probabilidades de que un agente vaya a establecerse?

- ¿Es el hospedero apto para la sobrevivencia del agente todo el año?
- ¿Es el clima apropriado para el agente?
- ¿Hay condiciones adecuadas para la diapausa (si el agente lo requiere)?

Microctonus rubecula es un parasitoide solitario de *Pieris rapae* introducido a los EU

Cepas de *Cotesia rubecula* probadas en los EU

Cepa Vancouver -clima maritimo

Cepa Yugoslava- clima continental, pero en otro grado de latitud

Cepa China-bien adaptada al clima y el fotoperiodo de MA

Discutir la historia aqui

Factores que afectan el exito de liberaciones (para establecimiento)

1. **Número de agentes liberados por locación**
2. **Calidad del agente (edad, virgen o copulado, bien alimentado, con contacto previo con hospederos)**
3. **El estadío de agente usado**

Chinese insect released to battle cabbage butterfly

WILLIAMSTOWN — A small, dark-colored insect from China has been released at Caretaker Farm in Williamstown in what a University of Massachusetts scientist hopes will be a successful biological control campaign against the cabbage butterfly.

The release is part of the state's Integrated Pest Management (IPM) program, in which researchers are developing non-chemical methods of battling pests which afflict agricultural crops and nursery stock.

The cabbage butterfly is a common pest of all members of the cole crop family, including broccoli, cabbage and brussels sprouts. The small, white butterfly lays its eggs on the stalks and leaves of these vegetables and the larvae feed upon the host plant.

This is not the first U.S. introduction of natural parasites aimed at the cabbage butterfly. That was done nearly 100 years ago, but, according to UMass biological control specialist Roy Van Driesche, scientists introduced an insect that was not specialized for the cabbage butterfly.

Working with biological control experts in China, Van Driesche has imported an insect (technical name: *Apanteles rubecula*) which is much better suited to attack the cabbage butterfly.

The small, wasp-like insect is a better way to fight cabbage butterfly, Van Driesche said, because it is more specialized for the plant and it kills the larvae at an earlier growth stage than the parasite introduced 100 years ago.

Attempts to introduce *Apanteles rubecula* in the U.S. have not been successful to date, Van Driesche said. But he thinks that is because the insects were imported from regions that did not have a good "photo-periodic match" with the areas where they were introduced. Insects use the length of the day as a trigger to go into their form of hibernation, called diapause, which enables them to survive winters.

If they are placed at a distinctly different latitude from their native region, they can be "fooled" into diapause at the incorrect time, which results in the insect's demise.

Van Driesche, whose work is funded by the state Department of Food and Agriculture, said the insects he has imported are from Beijing, which is located at a similar latitude to Massachusetts and thus should provide a good "photo-periodic match."

The project got its start when Van Driesche read about *Apanteles rubecula* in a Chinese biological control journal. He began corresponding with Chinese scientists and arranged to have a population imported. After spending the required time at the U.S. Department of Agriculture's quarantine facility in Newark, Del., the insects were transported to Van Driesche's lab in Amherst. He released about 200 to 300 of the insects at Caretaker Farm.

Jeffrey L. Carlson, chief of the State Pesticide Bureau, said the Department of Food and Agriculture is committed to biological controls as a component of the IPM program.

"The use of natural predators and parasites to combat pests already has been proven to be effective and we think the potential for further advances is enormous," Carlson said. "We believe IPM is and will be a very useful technique as we seek to protect our groundwater from chemical contamination. Dr. Van Driesche's aggressive research is a critical element in the IPM program."

Over the past several years, the Department of Food and Agriculture and the Cooperative Extension Service at the University of Massachusetts have developed IPM programs that have significantly reduced pesticide use on potatoes, strawberries, cranberries, sweet corn, and apples.

In addition to greater reliance on biological controls, IPM encourages extensive scouting before spraying to determine if pest populations are great enough to warrant the application of chemicals.

Liberación de *Cotesia rubecula* en MA

Escogiendo y protegiendo sitios de liberaciones

1. **Seguridad** (evitar plaguicidas, fuegos, inundaciones, destrucción o cosecha del cultivo)
2. **Hospederos** (suficientes, todo el tiempo)
3. **Manejo de sitio** (un acuerdo con el dueño)
4. **Microclima** (¿apto?)
5. **Proximidad de otros lugares adecuados para el agente** (no demasiado aislado)

“Liberación sin jaula”

Poniendo capullos de *Cotesia rubecula* en repollo con larvas de *Pieris rapae*

“Liberación en jaula”

Detección de reprodución del agente en el campo después de la liberación

El descubrimiento de un capullo de *Cotesia rubecula* sobre la planta es un indicio de reprodución de este parasitoide en el campo

Liberación de *Coccinella septempunctata* (“C-7”) (Coccinellidae), un depredador de áfidos

Jaulas para liberación contra insectos infestando árboles