REQUISITOS FITOSANITARIOS PARA LA EXPORTACIÓN DE FRUTOS DE AGUACATE HASS (*Persea americana*) DESDE COLOMBIA HACIA ESTADOS UNIDOS DE AMÉRICA

A continuación se presentan los siguientes documentos:

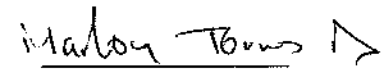
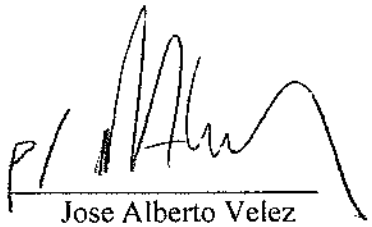
- **Plan operativo de trabajo entre el Instituto Colombiano Agropecuario (ICA) y Animal and Plant Health Inspection Service (APHIS) (English/Español):** Éste presenta los requerimientos de producción, salvaguarda, tratamiento (si aplica), certificación de exportación, y envío, además de aclarar los deberes y responsabilidades de cada participante……..2

- **Surveillance protocol for quarantine pests *Heilipus lauri, Heilipus trifasciatus* and *Stenoma catenifer* at Hass avocado production sites and their buffer area (English):** En éste se establece el protocolo para la vigilancia de plagas cuarentenarias en lugares de producción de aguacate Hass y el área buffer……..27

- **Adenda: Protocolo vigilancia plagas cuarentenarias *Heilipus lauri, Heilipus trifasciatus* y *Stenoma catenifer* en lugares de producción de aguacate Hass y su área buffer (English/Español):** Se aclaran algunas especificaciones relacionadas con la metodología implementada para la vigilancia de plagas cuarentenarias en lugares de producción de aguacate Hass……..54

Operational Work Plan	**Plan Operativo de Trabajo**
Systems Approach for the Importation of Fresh Hass Avocado from Colombia into the Continental United States	Enfoque de Sistemas para la Importación de Aguacate Fresco Hass de Colombia a los Estados Unidos Continentales
Effective Date: August 25, 2017	Fecha Efectiva:
Version Number: August 2017	Número de Versión: Agosto 2017

SIGNATORIES / SIGNATARIOS

UNITED STATES	COLOMBIA
_____ Andrea Simao Assistant Deputy Administrator Plant Protection and Quarantine Animal and Plant Health Inspection Service Riverdale, Maryland **Date:** _____	 Marlon Lucio Torres Subgerente de Protección Vegetal Instituto Colombiano Agropecuario Bogotá, Colombia **Fecha:** _____
	 Jose Alberto Velez Executive President CORPOHASS Bogota, Colombia **Fecha:** _____

SIGNATORIES / SIGNATARIOS

UNITED STATES	COLOMBIA
Andrea Simao Assistant Deputy Administrator Plant Protection and Quarantine Animal and Plant Health Inspection Service Riverdale, Maryland **Date:** August 25, 2017	Marlon Lucio Torres Subgerente de Protección Vegetal Instituto Colombiano Agropecuario Bogotá, Colombia **Fecha:** Agosto 16/2017
	Jose Alberto Velez Executive President CORPOHASS Bogota, Colombia **Fecha:** Agosto 16/2017

Summary	Resumen
This Operational Work Plan (OWP) was developed jointly by the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), and Colombian Agricultural Institute (ICA).	Este Plan Operativo de Trabajo (POT) fue desarrollado conjuntamente por el Servicio de Inspección de Sanidad Animal y Vegetal (APHIS) del Departamento de Agricultura de Estados Unidos (USDA), y el Instituto Colombiano Agropecuario (ICA).
The OWP will be used to identify the requirements for production, safeguarding, treatment (if applicable), export certification, and shipping. It is intended to clarify the duties and responsibilities of each partner; clearly explain the pest mitigation actions necessary to ensure the phytosanitary integrity of commodities exported to the United States from Colombia; and to protect against the accidental introduction of quarantine significant pests via this pathway. Technical explanations will be provided, as appropriate, to ensure all partners understand the biological basis of the actions required.	Este POT será utilizado para identificar los requerimientos de producción, salvaguardia, tratamiento (si aplica), certificación de exportación, y envío. Este pretende aclarar los deberes y responsabilidades de cada participante; explicar claramente las acciones de mitigación de plagas, necesarias para asegurar la integridad fitosanitaria de los productos exportados a los Estados Unidos desde Colombia; y protegerse de la introducción accidental de plagas cuarentenarias a través de esta vía. Se proveerán explicaciones técnicas como sea apropiado, para asegurar que todos los participantes entiendan la base biológica de las acciones requeridas.
English and Spanish are the official languages of this OWP; however, the English version of this document supersedes in the event of a conflict with the Spanish version.	El inglés y español son los idiomas oficiales de este POT; sin embargo, la versión en inglés de este documento prevalecerá en caso de conflicto con la versión en español.
APHIS policies for Offshore Programs apply to this program. As signatories to this agreement, deviation from these guidelines is not authorized unless previous approval is given by APHIS Offshore Programs. All deviations will be documented in writing.	Las políticas de APHIS para Programas fuera de sus fronteras, aplican a este programa. Como signatarios a este acuerdo, no se pueden desentender estos lineamientos a menos que sea autorizado previamente por el Programa offshore de APHIS. Toda desviación será documentada por escrito.
This OWP shall be in force when signed and until a new OWP is approved and signed by all parties. Exports may	Este POT estará en vigor cuando este firmado y hasta que un nuevo POT sea aprobado y firmado por todas las

commence when all requirements of the work plan have been met, after being verified by ICA and/or APHIS, and approved by APHIS.	partes. Las exportaciones pueden iniciarse cuando se cumplan todos los requisitos del plan de trabajo, después de ser verificado por ICA y/o APHIS, y aprobados por APHIS.

TABLE OF CONTENTS	TABLA DE CONTENIDO
1. Program Overview	**1. Visión General del Programa**
1.1 Commodities Included in this	1.1 Productos Incluidos en este Programa
1.2 Regulated Quarantine Pests	1.2 Plagas Cuarentenarias Reguladas
1.3 Participating Organizations	1.3 Organizaciones Participantes
1.4 Relevant Authority and Policy	1.4 Autoridad Pertinente y Política
2. Roles and Responsibilities of	**2. Roles y Responsabilidades de los Participantes**
2.1 APHIS	2.1 APHIS
2.2 ICA	2.2 ICA
2.3 Exporters	2.3 Exportadores
3. Phytosanitary Requirements for Export to the Continental United	**3. Requisitos Fitosanitarios para Exportar a los Estados Unidos**
3.1 Measures and Actions Applied in the Exporting Country	3.1 Medidas y Acciones Aplicadas en el País de Exportación (Colombia)
3.1.1 Production Site Requirements and Actions	3.1.1 Acciones y Requisitos para el Sitio de Producción
3.1.2 Packing House Safeguarding Requirements	3.1.2 Acciones y Requisitos de Resguardo para Plantas Empacadoras
3.1.3 Traceability	3.1.3 Trazabilidad
3.1.4 Export Inspection and Phytosanitary Certification	3.1.4 Inspección de Exportación y Certificación Fitosanitaria
3.1.5 Loading and Shipping	3.1.5 Embarque y Envío
3.2 Measures and Actions Applied in the United States	3.2 Medidas y Acciones Aplicadas en los Estados Unidos
4. Non-Compliance, Suspension, and Termination	**4. Incumplimiento, Suspensión, y Terminación**
4.1 Noncompliance and Corrective Actions	4.1 Incumplimiento y Acciones Correctivas
4.2 Suspension and Reinstatement	4.2 Suspensión y Reinstalación
4.3 Conditions for Termination	4.3 Condiciones para Terminación
5. Program Audit, Review	**5. Auditoría, Revisión del Programa**
5.1 Audits	5.1 Auditorías
5.2 Work Plan Modification	5.2 Modificación al Plan de Trabajo

1. Program Overview	1. Descripción General del Programa
1.1 Commodities included in this program:	1.1 Productos incluidos en este programa:
• Fresh fruit of Hass variety avocado (*Persea americana* P. Mill.) to the continental United States.	• Fruta fresca aguacate variedad Hass (*Persea americana* P. Mill.) a los Estados Unidos continentales.
1.2 Regulated Pests:	1.2 Plagas Reguladas:
• *Heilipus lauri* (Boheman) (Coleoptera: Curculionidae) – avocado seed weevil	• *Heilipus lauri* (Boheman) (Coleoptera: Curculionidae) – picudo de la semilla de aguacate
• *Heilipus trifasciatus* (Fabricius) (Coleoptera: Curculionidae) – avocado seed weevil	• *Heilipus trifasciatus* (Fabricius) (Coleoptera: Curculionidae) – picudo de la semilla de aguacate
• *Stenoma catenifer* Walsingham (Lepidoptera: Elaschistidae) – avocado seed moth	• *Stenoma catenifer* Walsingham (Lepidoptera: Elaschistidae) – polilla de la semilla del aguacate
1.3 Participating Organizations:	1.3 Organizaciones Participantes:
• United States Department of Agriculture, Animal and Plant Health Inspection Service (APHIS)	• Servicio de Inspección de Salud Animal y Vegetal (APHIS) del Departamento de Agricultura de los Estados Unidos
• Instituto Colombiano Agropecuario, hereafter referred to as 'ICA'	• Instituto Colombiano Agropecuario, referido como ICA en adelante.
• Corporación de Productores y Exportadores de Aguacate Hass de Colombia (CORPOHASS)	• Corporación de Productores y Exportadores de Aguacate Hass de Colombia (CORPOHASS)
1.4 Relevant Authority and Policy:	1.4 Autoridades Relevantes y Regulación:
Phytosanitary conditions for the import of Hass avocado from Colombia will be set forth, if approved, by amendment to existing fruit and vegetable import regulations in the United States Code of Federal Regulations (CFR), Title 7: Agriculture, Part 319 - Foreign Quarantine Notices, Subpart 56 - Fruits and Vegetables, Section 73-	Las condiciones fitosanitarias para la importación de aguacate Hass de Colombia se establecerán, si son aprobadas, mediante la modificación de las regulaciones existentes de importación de frutas y vegetales en el Código de Regulaciones Federales (CFR) de los Estados Unidos, Título 7: Agricultura, Parte 319 - Subparte 56 - Frutas y Vegetales, Sección 73-

Hass avocado from Colombia (7 CFR 319.56- 78).	Aguacate Hass de Colombia (7 CFR 319.56-78).
Articles accompanied by unmanufactured wood articles, or packaging materials, including wood packaging material, are subject to the International Plant Protection Convention's International Standards for Phytosanitary Measures (ISPM 15) and APHIS' regulations under 7 CFR, Part 319, Subpart 40 - Logs, Lumber, and other Unmanufactured Wood Products, and Subpart 69 - Packaging Materials. These articles may be subject to port of entry compliance verification.	Los artículos acompañados de objetos de madera no manufacturados o que incluyan material de embalaje de madera, están sujetos a las Normas Internacionales de Medidas Fitosanitarias (NIMF 15) de la Convención Internacional de Protección de Plantas y a las regulaciones de APHIS bajo el 7 CFR, Parte 319, Subparte 40 - postes, maderos y otros productos no manufacturados de madera, y la Subparte 69 - Materiales de embalaje. Estos artículos podrían estar sujetos a la verificación del cumplimiento de los requisitos en el puerto de entrada.
Articles and conveyances are subject to inspection requirements as described in 7 CFR Part 330 - Federal Plant Pest Regulations; General; Plant Pests; Soil, Stone, And Quarry Products; Garbage and Part 352 - Plant Quarantine Safeguard Regulations. These and other applicable U.S. Regulations may be accessed at: http://www.ecfr.gov	Los artículos y medios de transporte están sujetos a los requisitos de inspección descritos en 7 CFR Parte 330 - Regulaciones Federales de Plagas de Plantas; Generales; Plagas de plantas; Suelo, Rocas, y productos de cantera, Basura y Parte 352 - Regulaciones de Salvaguardia de Cuarentena Vegetal. Estos y otros Reglamentos de los Estados Unidos aplicables pueden ser consultados en: http://www.ecfr.gov
Articles are subject to port of entry document verification, and may be subject to other monitoring, physical inspection, or other actions at U.S ports of entry as deemed necessary by the Department of Homeland Security, U.S. Customs and Border Protection (CBP), U.S. Food and Drug Administration (FDA), and other pertinent Federal regulatory agencies.	Los artículos están sujetos a la verificación de la documentación en el puerto de entrada, así como pueden estar sujetos a otros monitoreos, inspecciones físicas u otras acciones en los puertos de entrada de los Estados Unidos, según lo considere necesario el Departamento de Seguridad Nacional, de Aduanas y Protección Fronteriza de los Estados Unidos (CBP), y la Administración de Medicamentos y Alimentos de los Estados Unidos (FDA), así como otras agencias federales pertinentes.
2. Roles and Responsibilities of Participants	**2. Roles y Responsabilidades de los Participantes**
2.1 APHIS:	2.1 APHIS:
• Support program operations by providing technical	• Apoyar las operaciones del programa proporcionando orientación técnica al

guidance to ICA as needed or upon request.	ICA según sea necesario o bajo petición.
• In collaboration with ICA, maintain, review, and revise OWP as necessary to accurately reflect program operations.	• En colaboración con el ICA, mantener y revisar el OWP según sea necesario para reflejar con precisión las operaciones del programa.
• Verify that the responsibilities of all participants with regard to technical requirements have been properly executed, and communicate any deficiencies to ICA to investigate and take corrective action if warranted.	• Verificar que las responsabilidades de todos los participantes con respecto a los requisitos técnicos han sido correctamente ejecutadas y comunicar cualquier deficiencia al ICA para investigar y tomar las medidas correctivas si se requiere.
• If necessary, based on noncompliance events or program audits conducted in accordance with APHIS' policy, provide qualified personnel to work cooperatively with ICA and all other program participants to review and evaluate operations in the field and packinghouses, pest management and control activities, and other safeguarding measures, and provide audit reports available to ICA in a timely manner.	• Si es necesario, respecto a eventos de incumplimiento o auditorías del programa ejecutadas de acuerdo a la política de APHIS, proveer personal capacitado para trabajar cooperativamente con el ICA y todos los participantes del programa para revisar, y evaluar las operaciones en campo y en empacadoras, las actividades de manejo y control de plagas, y otras medidas de salvaguardia, y proporcionar al ICA de forma oportuna informes sobre auditorías.
• Provide guidance and/or instructions to CBP for port of entry clearance of consignments.	• Proporcionar orientación y/o instrucciones al CBP para la autorización oficial de los despachos en el puerto de entrada.
2.2 Instituto Colombiano Agropecuario (ICA):	2.2 Instituto Colombiano Agropecuario (ICA):
• Supervise the operations of the program, including all activities indicated in this OWP, to ensure that the program participants comply with the phytosanitary standards established by APHIS and ICA.	• Supervisar las operaciones del programa, incluyendo todas las actividades indicadas en este POT, para asegurar que los participantes del programa cumplan con las normas fitosanitarias establecidas por APHIS e ICA.
• Maintain documentation related to ICA's program	• Mantener la documentación relacionada con la supervisión del

oversight for at least one year and provide to APHIS upon request.	programa del ICA durante al menos un año y proporcionarla a APHIS cuando lo solicite.
• In collaboration with APHIS, maintain, review, and revise OWP as necessary to accurately reflect program operations.	• En colaboración con APHIS, revisar el POT según sea necesario para reflejar con precisión las operaciones del programa.
• Register and individually approve for export only those avocado production sites that meet conditions as indicated in this OWP.	• Registrar y aprobar individualmente para exportación, únicamente los sitios de producción de aguacate que cumplan con las condiciones indicadas en este POT.
• Register all packinghouses participating in this program.	• Registrar todas las empacadoras que participan en este programa.
• Carry out inspection and approval of the packinghouses, or processing facilities, as well as their storage chambers and transport means when appropriate, in order to verify that they comply with the cleaning and safeguarding requirements required for the mobilization and export of fruits for export.	• Realizar la inspección y aprobación de las empacadoras o instalaciones de procesamiento, así como sus cámaras de almacenamiento y medios de transporte, para verificar que cumplen con los requisitos de limpieza y salvaguardia requeridos para la movilización y exportación de frutas para exportación.
• Maintain an up-to-date list of registered program participants, including production sites and packinghouses, and provide the list to APHIS upon request.	• Mantener una lista actualizada de los participantes del programa, incluidos los sitios de producción y de empaque, y proporcionar la lista a APHIS si lo solicita.
• Conduct export certification inspection activities and issue Phytosanitary Certificates with appropriate Additional Declarations, if necessary, only for consignments that pass export inspection.	• Llevar a cabo actividades de inspección y certificación de exportaciones y si es necesario, emitir Certificados Fitosanitarios con las Declaraciones Adicionales apropiadas, sólo para envíos que pasen la inspección de exportación.
• Before the beginning of each season, check the APHIS online database 'Fruits and Vegetables Import Requirements (FAVIR)' entry for Hass Avocado from	• Antes del inicio de cada temporada, comprobar en la base de datos en línea de APHIS "Requisitos de Importación de Frutas y Vegetales (FAVIR)" la entrada de Aguacate Hass de Colombia y determinar el

Colombia to determine the specific language required for Additional Declaration(s). FAVIR may be found at: https://epermits.aphis.usda.gov/manu al/index.	idioma específico requerido para las Declaraciones Adicionales. FAVIR se puede encontrar en: https://epermits.aphis.usda.gov/manual/index
• Take immediate action to correct any noncompliance issue detected, and if necessary, suspend or revoke participant registration until noncompliance has been corrected, and immediately report any participant suspension to APHIS.	• Tomar inmediatamente las medidas necesarias para corregir cualquier inconveniente de incumplimiento detectado, y si es necesario, suspender o revocar el registro de los participantes hasta que se haya corregido el incumplimiento e informar inmediatamente a APHIS de cualquier suspensión de los participantes.
• Maintain, for at least three years, all documentation related to noncompliance and corrective actions taken and provide to APHIS upon request.	• Mantener, durante al menos tres años, toda la documentación relacionada con el incumplimiento y las acciones correctivas tomadas y proporcionarlas a solicitud de APHIS.
2.3 Corporación de Productores y Exportadores de Aguacate Hass de Colombia (CORPOHASS):	2.3 Corporación de Productores y Exportadores de Aguacate Hass de Colombia (CORPOHASS):
• Maintain up-to-date knowledge of the phytosanitary requirements established by APHIS and ICA, and comply with the conditions of this OWP, APHIS regulations and policy, and ICA's Export Certification Procedures, for the export of Hass avocado to the Continental United States and its Territories.	• Mantener información actualizada sobre los requisitos fitosanitarios establecidos por APHIS y el ICA y cumplir con las condiciones de este POT, las regulaciones y políticas de APHIS y los Procedimientos de Certificación de Exportaciones del ICA para la exportación de aguacate Hass a los Estados Unidos Continentales
• Cooperate with APHIS and ICA to maintain the phytosanitary integrity of the program.	• Cooperar con APHIS y el ICA para mantener la integridad fitosanitaria del programa.
• Participants must allow APHIS personnel access to the production, packing, warehouse, and facilities used	• Los participantes deben permitir que el personal de APHIS tenga acceso a la producción, empaque, almacenaje e instalaciones utilizadas para la

for the production, processing, and export of Hass avocado to Continental United States and Territories and allow access to all records and documents relating to the operations of the program.	producción, procesamiento y exportación de aguacate Hass a los Estados Unidos Continentales y sus territorios, y conceder acceso a todos los registros y documentos relacionados con las operaciones del programa.
• Propose production sites and packinghouses to ICA prior to the start of the export season.	• Proponer los sitios de producción y las empacadoras al ICA antes del inicio de la temporada de exportación.
• Ensure that all boxes or packaging for export have a seal with the information or codes for the production, packinghouse, and origin of the product.	• Asegurarse que todas las cajas o empaques para la exportación contengan un sello con la información y los códigos de producción, de la empacadora y origen del producto.
• Bear the costs of APHIS personnel providing oversight when it is deemed necessary to audit the export program, as well as provide to ICA the total costs associated with certification activities of production, packaging, and shipment inspection sites, among others.	• Cuando se considere necesario auditar el programa de exportación, asumir los costos del personal de APHIS que proporciona la supervisión, así como proporcionar al ICA los costos totales asociados con las actividades de certificación de producción, empaque y sitios de inspección de embarques, entre otros.
3. Phytosanitary Requirements for Export to the Continental United States	**3. Requisitos Fitosanitarios para Exportar a los Estados Unidos Continentales**
3.1 Measures and Actions Applied in the Exporting Country (Colombia)	3.1 Medidas y Acciones Aplicadas en el País Exportador (Colombia)
3.1.1. Production Site Requirements and Actions:	3.1.1 Requerimientos de los Sitios de Producción y Acciones:
• Avocados to be exported to the United States must be grown in pest free production sites for the pests identified within this OWP.	• Los aguacates exportados a los Estados Unidos deben ser cultivados en sitios de producción libres de las plagas identificadas dentro de este POT.
• Establishment and maintenance of pest-free sites	• El establecimiento y mantenimiento de los sitios libres de plagas deben

must be in accordance with international standards (e.g., IPPC, 1996; 1999).	estar de acuerdo con las normas internacionales (por ejemplo, IPPC, 1996, 1999).
• APHIS must approve the survey protocol used to determine and maintain pest free status, as well as protocols for actions to be performed upon detection of a pest.	• APHIS debe aprobar el protocolo de vigilancia utilizado para determinar y mantener el estatus libre de plagas, así como los protocolos para las acciones que se deben realizar al detectar una plaga.
• ICA must establish a survey program for *Heilipus lauri*, *H. trifasciatus*, and *Stenoma catenifer*.	• El ICA debe establecer un programa de vigilancia para *Heilipus lauri*, *H. trifasciatus* y *Stenoma catenifer*.
• APHIS will review this data and determine if the production sites where avocados are grown qualify as pest free.	• APHIS revisará estos datos y determinará si los sitios de producción donde se cultivan los aguacates califican como libres de plagas.
• Pest free sites are subject to subsequent APHIS audits to verify they have maintained their status.	• Los sitios libres de plagas están sujetos a las auditorías de APHIS para verificar que han mantenido su estado.
• One of two options is possible for export of Hass avocados from pest free sites:	• Es posible exportar aguacates Hass desde sitios libres de plagas bajo una de las dos opciones:
i. Municipality Pest Freedom: The Municipality must be surveyed every 6 months (twice a year) for the identified avocado seed pests. Representative areas of the Municipality where there are avocado trees, including production sites and urban areas, must be sampled.	i. ~~Departamento~~ Municipio Libre de Plagas: El municipio debe ser vigilado cada seis meses (dos veces al año) para las plagas de la semilla del aguacate identificadas. Se deben tomar muestras de áreas representativas del Municipio donde hay árboles de aguacate, incluyendo sitios de producción y áreas urbanas.
ii. Pest Free Sites: If Municipalities are not completely free of avocado regulated pests, ICA can certify individual sites as pest	ii. Sitios Libres de Plagas: Si los municipios no están completamente libres de las plagas reguladas de aguacate, ICA puede certificar sitios individuales como libres de plagas.

free.	
The surveys for pest free sites must include representative areas from each registered site and a buffer zone of 1 kilometer; which will be defined as the area within 1 kilometer of the edge of the site.	La vigilancia para sitios libres de plagas debe incluir áreas representativas de cada sitio registrado y una zona buffer de 1 kilómetro que se definirá como el área dentro de 1 kilómetro del borde del sitio.
• Production sites and buffer zones must be surveyed (see appendix for survey protocol) monthly for the identified avocado seed pests from 2 months before harvest until harvest is completed.	• Los sitios de producción y las zonas buffer deben ser vigilados (Véase el apéndice para el protocolo de encuesta) mensualmente para las plagas de la semilla del aguacate identificadas, 2 meses antes de la cosecha hasta que se complete la cosecha,
• Detection of one or more quarantine significant pests during a survey or during any other monitoring or inspection activity will result in immediate suspension of the affected orchard from the export program until appropriate measures to reestablish pest freedom, agreed upon by ICA and APHIS, are taken.	• La detección de una o más plagas de importancia cuarentenaria durante la vigilancia o durante cualquier otra actividad de monitoreo o inspección, resultará en la suspensión inmediata del lugar de producción afectado del programa de exportación hasta que se tomen las medidas apropiadas acordadas por el ICA y APHIS para reestablecer su condición de libre de plagas.
• Detection of one or more quarantine significant pests at backyards in buffer area will activate a pest management plan which must be applied immediately. This will not affect the continuity in the period required for a place of production to be declared pest free, unless not corrective actions be taken.	• La detección de una o más plagas cuarentenarias en traspatios, ubicados dentro del área buffer, activará un plan de manejo de la plaga las cuales deberán tomarse de manera inmediata. Esto no afectara la continuidad del periodo de tiempo requerido para que un lugar de producción sea declarado como libre de plagas a menos que las acciones correctivas no sean tomadas.
○ These measures may include further delimiting surveys, appropriate pesticide treatments, and removal	○ Estas medidas pueden incluir monitoreos de delimitación adicionales, tratamientos adecuados con plaguicidas y eliminación del material

of infested host material.	hospedante infestado.
○ ICA must keep records of quarantine significant pest detections for each site, and update the records each time they are surveyed, and must make the records available to APHIS upon request.	○ El ICA debe mantener registros de detecciones de plagas de importancia cuarentenaria para cada sitio, y actualizarlos cada vez que son monitoreados, y a solicitud de APHIS poner a disposición los registros.
○ The records must be maintained for at least 1 year after the harvest.	○ Los registros deben mantenerse por lo menos 1 año después de la cosecha.
• Production site Registration: Avocados must be grown in sites registered with ICA.	• Registro del sitio de Producción: Los aguacates deben ser cultivados en sitios registrados ante el ICA.
○ ICA will visit and inspect monthly, starting two months before harvest, and continue until the end of the shipping season.	○ El ICA visitará e inspeccionará mensualmente, comenzando dos meses antes de la cosecha, y continuando hasta el final de la temporada de envíos.
○ The personnel conducting pest surveys must be hired, trained, and supervised by ICA.	○ El personal que realiza la vigilancia de plagas debe ser contratado, entrenado y supervisado por el ICA.
○ ICA will certify that each place follows pest control guidelines, when necessary, to reduce regulated pest populations.	○ El ICA certificará, cuando sea necesario, que cada lugar cumple los lineamientos de control de plagas para reducir las poblaciones de plagas reguladas.
○ APHIS may monitor the sites if necessary.	○ APHIS puede monitorear los sitios si es necesario.
• Grove sanitation: Avocados fallen from the trees must be removed from the site at least once every seven days, starting two months before harvest and continuing through the end of the harvest, and may not be included in field containers of fruit to be packed for export.	• Sanidad del lugar de producción: Los aguacates caídos de los árboles deben ser removidos del sitio por lo menos una vez cada siete días, comenzando dos meses antes de la cosecha y continuando hasta el final de la cosecha, y no pueden ser incluidos en los contenedores de fruta de campo destinada para exportación.
3.1.2 Packinghouse Requirements and Actions:	3.1.2 Requerimientos de la Empacadora y Acciones:

• Post-harvest processing and packing must take place in a packinghouse registered and approved by ICA.	• El procesamiento y empaque después de la cosecha debe llevarse a cabo en una empacadora registrada y aprobada por el ICA.
• Packinghouses must:	• Las empacadoras deben:
o Be pest exclusionary structures;	o Ser estructuras de exclusión de plagas;
o Must have double doors at the entrance;	o Deben tener doble puerta en la entrada;
o All openings in the packinghouse must be covered with a mesh that has openings no bigger than 1.6mm;	o Todas las aberturas de la empacadora deben estar cubiertas con una malla que tenga aberturas no mayores de 1,6 mm;
o Maintain packing lines clean and in good working order;	o Mantener las líneas de empaque limpias y en buen estado de funcionamiento;
o Maintain processing and storage areas free of rubble, waste, and debris at all times;	o Mantener las áreas de procesamiento y almacenamiento libres de escombros y desperdicios en todo momento;
o Implement a general pest control program; and,	o Implementar un programa general de control de plagas; y,
o Remove discarded fruit daily.	o Retirar los frutos desechados diariamente.
• Hass avocado must be packed within 24 hours of harvest or cold storage and must be safeguarded by an insect-proof mesh screen or plastic tarpaulin while in transit to the packinghouse and while awaiting packing when in a fruit fly area.	• El aguacate Hass debe ser empacado dentro de las 24 horas siguientes a la cosecha, o bajo almacenamiento en frío, y debe ser salvaguardado por una malla a prueba de insectos o lona de plástico durante el tránsito a la empacadora y mientras se espera que sea empacado cuando está en un área de moscas de la fruta.
• For transit to the Continental United States or its Territories, Avocado must be kept safeguarded under enclosed conditions and these conditions must remain until arrival in the Continental United States	• Para el tránsito hacia los Estados Unidos continentales o sus territorios, el aguacate debe ser salvaguardado bajo condiciones de resguardo, las cuales deben mantenerse hasta su llegada a los Estados Unidos continentales
• During the time the packinghouse is in use for exporting avocado to the	• Mientras la empacadora está en uso para exportar aguacate a los Estados Unidos o sus territorios, esta sólo

Continental United States, the packinghouse may only accept avocados from registered and approved production sites.	puede aceptar aguacates de sitios de producción registrados y aprobados.
• Packaged Hass avocado may be stored together regardless of country of destination, but consignments of avocado destined to the Continental United States and must be physically separated by a minimum of 3 feet (1 meter) from fresh avocado consignments to other destinations.	• El aguacate Hass empacado puede almacenarse junto, independientemente del país de destino; sin embargo, los envíos de aguacate destinados a los Estados Unidos continentales deben estar físicamente separados por un mínimo de 3 pies (1 metro) de despachos de aguacates frescos a otros destinos.
3.1.3 Traceability	3.1.3 Trazabilidad
• The avocados must be moved to the packinghouse within three hours of harvest or must be safeguarded from pest infestation until moved.	• Los aguacates deben ser trasladados a la empacadora dentro de las tres horas de la cosecha o se deben salvaguardar de la infestación de plagas hasta su traslado.
• Harvested avocados must be placed in field cartons or containers that are marked to show the official registration number of the production site.	• Los aguacates cosechados deben ser ubicados en cajas de cartón o contenedores en los que se indique el número de registro oficial del sitio de producción.
• The site where the avocados were grown must remain identifiable when the fruit leaves the field, at the packinghouse, and throughout the export process.	• El sitio donde se cultivaron los aguacates debe permanecer identificable cuando el fruto abandona el campo, en la empacadora y durante todo el proceso de exportación.
• Boxes in which avocados are packed must be labeled with traceability data that provides information about the site where the fruit originated and packinghouse where it was processed.	• Las cajas en las que los aguacates están empacados deben estar etiquetadas con datos de trazabilidad que proporcionen información sobre el sitio de origen de la fruta y la empacadora donde fue procesada.
• Labeling must be of a size that clearly displays traceability information.	• El etiquetado debe tener un tamaño que muestre claramente la información de trazabilidad.

3.1.4 Export Inspection and Phytosanitary Certification:	3.1.4 Inspección de Exportación y Certificación Fitosanitaria:
• A biometric sample of avocado fruit from each production site must be inspected in Colombia by ICA following any post-harvest processing.	• Una muestra biométrica de la fruta de aguacate de cada sitio de producción debe ser inspeccionada en Colombia por el ICA después de cualquier procesamiento posterior a la cosecha.
o A biometric sample at a rate determined by APHIS will be visually inspected for all quarantine pests.	o Una muestra biométrica a una tasa determinada por APHIS será inspeccionada visualmente para todas las plagas cuarentenarias.
o A portion of the fruit will be cut open to detect internal pests, such as the weevils or moth identified in this work plan.	o Se cortará una parte de la fruta para detectar plagas internas identificadas en este plan de trabajo, como los picudos o polilla de la semilla de aguacate
• Fruit presented for inspection at the port of entry to the United States must be identified in the shipping documents accompanying each lot of fruit to specify the production site or sites, in which the fruit was produced, and the packing shed or sheds, in which the fruit was processed.	• Las frutas presentadas para inspección en el puerto de entrada en los Estados Unidos deben ser identificadas en los documentos de embarque que acompañan a cada lote de fruta, para especificar el sitio o sitios de producción de donde proviene la fruta y la empacadora(s) en donde fue procesada.
o This identification must be maintained until the fruit is released for entry into the United States.	o Esta identificación debe mantenerse hasta que se libere la fruta para entrar en los Estados Unidos.
o A biometric sample will be visually inspected for quarantine pests.	o Una muestra biométrica será inspeccionada visualmente para detectar plagas cuarentenarias.
o A portion of the fruit will be cut open to detect any quarantine significant internal pests as identified in this OWP.	o Una parte de la fruta será cortada para detectar cualquier plaga interna de importancia cuarentenaria como se identifica en este POT.
• Registered packing houses are required to notify ICA of their fruit packing schedules to plan for	• Se requiere que las empacadoras registradas notifiquen al ICA sus horarios de embalaje de frutas para planificar las actividades necesarias de

necessary phytosanitary export certification activities.	certificación fitosanitaria de exportación.
• The ICA inspector must verify that the avocados originated from and been processed at registered and approved production sites and packinghouses.	• El inspector del ICA debe verificar que los aguacates se originaron y procesaron en los sitios de producción y empacadoras registradas y aprobadas.
o The inspector will randomly select 150 avocados per lot, for a 95 percent confidence level of detecting a 2 percent pest population, and visually inspect for the presence of pests or indications of pest damage, using a magnifying glass or other inspection tools if necessary.	o El inspector seleccionará aleatoriamente 150 aguacates por lote, para un nivel de confianza del 95 por ciento para detectar una población de 2 por ciento de plagas, e inspeccionará visualmente la presencia de plagas o indicaciones de daño de plagas, usando una lupa u otras herramientas de inspección si es necesario.
o All suspect or damaged fruit will be cut, or a minimum of 30 fruit per lot, to detect the presence of internal pests.	o Se cortarán todos los frutos sospechosos o dañados, o un mínimo de 30 frutos por lote, para detectar la presencia de plagas internas.
• Any insect pests must be identified to species level. Any organism found which either cannot be identified to species or whose quarantine significance is unknown will be considered quarantine significant for regulatory purposes and the lot not allowed for export under this work plan.	• Cualquier insecto plaga debe ser identificado a nivel de especie. Se considerará que cualquier organismo que no pueda identificarse a nivel de especie o cuya importancia cuarentenaria es desconocida, será considerado de importancia cuarentenaria para fines regulatorios y no se le permitirá al lote la exportación bajo este plan de trabajo.
• Inspection results, including traceability information for the sample size, number of fruit cut, and pest and disease findings, if any, must be recorded. All records will be provided to APHIS upon request.	• Se deben registrar los resultados de la inspección, incluyendo la información de trazabilidad para el tamaño de la muestra, el número de fruta cortada y los hallazgos de plagas y enfermedades, si los hay. Todos los registros serán proporcionados bajo solicitud de APHIS.

• Only lots passing inspection will be eligible for export and Phytosanitary Certificate issuance by ICA stating that the fruit in the consignment has been produced in accordance with the requirements of the systems approach in 7 CFR 319.56-78. (**FAVIR must be checked for appropriate additional declarations.**)	• Solo lotes que pasaron la inspección serán elegibles para la exportación y la emisión del Certificado Fitosanitario del ICA, indicando que la fruta en el envío ha sido producida de acuerdo con los requisitos del enfoque de sistemas en el 7 CFR 319.56-78. (**FAVIR debe ser verificado para las declaraciones adicionales apropiadas.**)
• The detection of live quarantine pests in or on fruit, or the detection of leaves and branches during export inspection activities will result in rejection of the entire lot belonging to / associated with the inspected sample.	• La detección de plagas cuarentenarias vivas en o sobre los frutos, o la detección de hojas y ramas durante las actividades de inspección de exportación, dará como resultado el rechazo de todo el lote perteneciente a la muestra inspeccionada o asociado a ella.
• Reconditioning and re-sampling is not permitted. Additional actions based on quarantine pest detections are detailed in Noncompliance, Suspension, and Termination.	• No se permite el reacondicionamiento y re-muestreo. Las acciones adicionales basadas en detecciones de plagas cuarentenarias se detallan en Incumplimiento, Suspensión y Terminación.
• Lots rejected for export to the Continental United States must be immediately removed from the export shipping zone.	• Los lotes rechazados para exportación a los Estados Unidos continentales s deben ser retirados inmediatamente de la zona de envío de exportación.
• If removal cannot occur immediately, the lot should be covered with an insect- proof net or be stored in a dedicated cold chamber for up to 24 hours during which time arrangements for disposal must be made.	• Si la eliminación no se da de inmediato, el lote deberá estar cubierto con una red a prueba de insectos o almacenarse en un cuarto frío, durante un período de hasta 24 horas, tiempo durante el cual se deben realizar los arreglos para la eliminación.
3.1.5 Loading and Shipping:	3.1.5 Carga y Transporte
• All containers should be inspected prior to loading	• Todos los contenedores deben ser inspeccionados antes de cargarlos

to ensure freedom from hitchhiking pests, debris, or other contaminants.	para asegurarse que están libre de plagas polizones, residuos u otros contaminantes.
• Wood packaging material including wooden pallets, if used, must be treated and marked per ISPM 15.	• El material de embalaje de madera, incluidas las estibas de madera, si se utilizan, debe ser tratado y marcado según la NIMF 15.
• Care should be taken to minimize the possibility of container infestation during loading.	• Se debe tener cuidado para minimizar la posibilidad de infestación de contenedores durante la carga.
• The loading area should be clean and clear of weeds;	• El área de carga debe estar limpia y libre de malezas;
• The container should seal properly against the loading dock of the packinghouse during loading; and,	• Durante la carga, el contenedor debe sellarse adecuadamente contra el muelle de carga de la empacadora.
o If possible, loading should not take place at night under lights which can attract flying insects.	o Si es posible, la carga no debe tener lugar durante la noche bajo luces que pueden atraer insectos voladores.
o Loaded containers must be sealed under ICA supervision with a strip or button seal prior to export.	o Los contenedores cargados deben ser sellados bajo la supervisión de ICA con una tira o sello de botón antes de la exportación.
o Phytosanitary safeguards, and container seals must remain intact until arrival and port of entry clearance in the United States.	o Las salvaguardias fitosanitarias, y los sellos o precintos de contenedores deben permanecer intactos hasta la llegada y proceso de autorización en puerto de entrada en los Estados Unidos.
3.2 Measures and Actions Applied in the United States:	3.2 Medidas y Acciones Aplicadas en los Estados Unidos:
• All Hass avocado consignments are subject to port of entry clearance; which may include physical inspection and fruit cutting to verify freedom from quarantine pests, upon arrival in the Continental United States or Territories.	• A su llegada a los Estados Unidos Continentales o Territorios, todos los envíos de aguacate Hass están sujetos a la autorización en el puerto de entrada, la cual puede incluir inspección física y corte de fruta para verificar la ausencia de plagas cuarentenarias.
• Any safeguards found not	• Cualquier salvaguardia que no se

intact or paperwork errors may cause and, if not resolved, rejection of the consignment for entry.	encuentre intacta o errores en la documentación, pueden causar retrasos en los despachos y, si no se resuelven, el rechazo de su entrada.
• Actions based on quarantine pest interceptions are detailed in Noncompliance, Suspension, and Termination.	• Las acciones basadas en interceptaciones de plagas cuarentenarias están detalladas en Incumplimiento, Suspensión y Terminación.
4. Non-compliance, Suspension, and Termination	**4. Incumplimiento, Suspensión, y Terminación**
4.1 Noncompliance and Corrective Actions:	4.1 Incumplimiento y Acciones Correctivas:
Any producer/production site, pest exclusionary structure, packinghouse, or exporter found not in compliance with the conditions of this work plan as determined by ICA and/or APHIS may be denied registration, approval, participation, and/or export certification services.	Cualquier productor/sitio de producción, estructura de exclusión de plagas, empacadora o exportador que no cumpla con las condiciones de este plan de trabajo determinado por el ICA y/o APHIS se le podrá denegar el registro, aprobación, participación y/o servicios de certificación de exportación.
Actions to take based on detection of a quarantine pest, either during pre-harvest inspection, or detection of a quarantine pest during export certification inspection in Colombia:	Acciones a tomar en base a la detección de una plaga cuarentenaria durante la inspección antes de la cosecha, o la detección de una plaga cuarentenaria durante la inspección de certificación de exportación en Colombia:
i. ICA will immediately suspend the production site and prohibit all fruit in the infested/infected pest exclusionary structure from export;	i. ICA suspenderá inmediatamente el sitio de producción y prohibirá la exportación de todas las frutas en la estructura de exclusión de plagas infestada/infectada;
ii. ICA will review the site to determine where infestation has occurred;	ii. ICA revisará el sitio para determinar dónde ocurrió la infestación;
o The production site must implement any remedial actions to prevent recurrence as recommended by ICA prior to re-instatement;	o El sitio de producción debe implementar cualquier acción correctiva para prevenir la reaparición según lo recomendado por el ICA antes de la reinstalación;

o ICA will provide a report of findings, remedial action, and participant status to APHIS.	o El ICA proporcionará a APHIS un informe de los hallazgos, las medidas correctivas y el estado de los participantes.
o The suspension remains in effect until ICA and APHIS determine that the pest risk has been mitigated.	o La suspensión sigue vigente hasta que el ICA y APHIS determinen que el riesgo de plagas ha sido mitigado.
iii. If quarantine pests are detected on two different lots from the same production site within one season:	iii. Si se detectan plagas cuarentenarias en dos lotes diferentes del mismo sitio de producción dentro de una temporada:
o The production site's registration will be cancelled;	o El registro del sitio de producción será cancelado;
o The grower may not ship any fruit from that production site to the United States or Territories for the remainder of the season; and,	o El productor no podrá enviar ninguna fruta de ese lugar de producción a los Estados Unidos o Territorios por el resto de la temporada; y,
o Participant registration cancellation must be immediately reported to APHIS.	o La cancelación del registro del participante deberá ser reportada inmediatamente a APHIS.
Actions to be taken based on noncompliance detected during U.S. port of entry clearance:	Acciones que se tomarán en base al incumplimiento detectado durante la autorización de entrada en los Estados Unidos:
o Interceptions of any live quarantine pests may result in rejection of the consignment upon entry.	o La interceptación de cualquier plaga cuarentenaria viva pueden resultar en el rechazo del despacho al momento del ingreso.
Outcomes of the investigation will determine subsequent actions.	Los resultados de la investigación determinarán las acciones subsiguientes.
4.2 Suspension and Reinstatement:	4.2 Suspensión y Reintegración:
• Repeated incidents of noncompliance on the part of multiple participants may be cause for program suspension pending a joint APHIS/ICA	• Incidentes repetidos de incumplimiento por parte de múltiples participantes pueden ser causa de suspensión del programa hasta que se lleve a cabo una revisión

program site visit review.	de auditoria conjunta de APHIS/ICA al programa.
4.3 Conditions for Termination	4.3 Condiciones para Terminación
• Either signatory party reserves the right to voluntarily withdraw from this OWP.	• Cualquiera de las partes signatarias se reserva el derecho de retirarse voluntariamente de este POT.
• Withdrawal will result in temporary suspension of all exports of Hass avocado from Colombia to the Continental United States and its Territories until such time that new or revised OWP conditions are agreed to, documented, and signed by all parties.	• El retiro dará lugar a la suspensión temporal de todas las exportaciones de aguacate Hass de Colombia a los Estados Unidos continentales y sus territorios hasta que se acuerden, documenten y firmen todas las partes nuevas o revisadas de las condiciones de este POT.
5. Program Audit and Review	**5. Auditoría al Programa y Revisión**
5.1 Audits:	5.1 Auditorías:
• ICA will periodically audit operations to ensure that all activities are conducted effectively in accordance with this OWP and applicable APHIS and ICA policies and regulations.	• ICA realizará auditorías periódicas para asegurar que todas las actividades se lleven a cabo de manera efectiva de acuerdo con este POT y las políticas y regulaciones aplicables de APHIS y el ICA.
APHIS reserves the right to request program audits in the event of noncompliance.	APHIS se reserva el derecho de solicitar auditorías del programa en caso de incumplimiento.
• APHIS costs associated with these audits will be supported by Industry via a Cooperative Services Agreement and cost recovery mechanisms.	• Los costos de APHIS asociados con estas auditorías pueden ser costeados por la Industria a través de un Acuerdo Cooperativo de Servicios y mecanismos de recuperación de costos.
• Cooperator representatives may be included in the audits which will be scheduled and coordinated with ICA.	• Los representantes de los cooperadores pueden ser incluidos en las auditorías que serán programadas y coordinadas con el ICA.
5.2 Work Plan Modification:	5.2 Modificación al Plan de Trabajo:

• Any changes must be made by bilateral agreement of the parties in the Appendices to this OWP.	• Cualquier cambio debe hacerse por acuerdo bilateral de las partes en los Apéndices de este POT.

Instituto Colombiano Agropecuario

SISTEMA DE GESTIÓN DE LA CALIDAD

PROCESO DE (APOYO, ESTRATÉGICO O MISIONAL)	
SUBPROCESO Ó ACTIVIDAD	**PROCEDIMIENTO**
Surveillance protocol for quarantine pests *Heilipus lauri, Heilipus trifasciatus* and *Stenoma catenifer* at Hass avocado production sites and their buffer area.	CÓDIGO

OBJECTIVE

To establish the surveillance protocol for quarantine pests *Heilipus lauri, Heilipus trifasciatus* and *Stenoma catenifer* at Hass avocado production sites and their buffer area.

OVERVIEW

1. INTRODUCTION

The avocado *Persea americana* Miller is a tropical fruit with increasing acceptance among consumers, thanks to its nutritional content and to the different options offered for fresh and processed consumption (Ministry of Agriculture and Rural Development, MARD, 2014). The Hass variety represents an opportunity for the agricultural sector of Colombia, due to its to export possibilities. In the context of recent free trade agreements, in which Colombia has great potential as a producer and exporter of fresh fruits and vegetables to destinations such as the United States, it is necessary to overcome the phytosanitary type restrictions limiting trade, specifically for the export of this product (MADR, 2006; Proexport, 2011).

During the past ten years, Colombia has increased the planted area of the Hass variety, which has led to that pest species that affect their production, as are the fruit borer *Stenoma catenifer* Walsingham (Lepidoptera: Oecophoridae) and borer *Heilipus lauri* Boheman and *Heilipus trifasciatus* (Fabricius) (Coleoptera: Curculionidae), are observed with greater frequency.

The Colombian Agricultural Institute, ICA, as national plant protection organization, executes actions of phytosanitary monitoring of quarantine and non-quarantine species, and determines their distribution and incidence on crops of agricultural importance.

In accordance with the rules of the market of some importing countries, it requires the declaration of production sites free of quarantine pests of avocado. It is therefore necessary to implement systematic epidemiological surveillance processes that permit the consolidation of information and update the phytosanitary status of the cultivation of Hass var. avocado in Colombia.

The early and timely detection of quarantine species in the main productive centers of the country are the basis for the scientific-technical support of the national and international phytosanitary status (IPPC, 2005). In addition, an integrated management program under the systems approach must be executed, with emphasis on the implementation and maintenance of a monitoring plan in accordance with the guidelines of the International Plant Protection Convention (IPPC).

2. GENERAL CHARACTERISTICS OF THE QUARANTINE SPECIES

2. 1. The avocado seed borer *Heilipus lauri* Boheman 1845

2.1.1. Taxonomic position

Class: Insecta

Order:	Coleoptera
Family:	Curculionidae
Subfamily:	Molytinae
Tribe:	Hylobinii
Genus:	*Heilipus*
Species:	*Heilipus lauri* Boheman (Figure 1.) Ref. Castaneda-Vildózola, 2008

2.1.2. Common names

- "Barrenador grande de la semilla del aguacate" (avocado seed large borer) and "picudo del hueso del aguacate" (avocado seed weevil), from Mexico to Costa Rica.
- Avocado seed weevil and large avocado seed weevil in the United States.
- Perforador (borer) and picudo de la semilla del aguacate (avocado seed weevil), in Colombia (Wysoski *et al.*, 2002; Caicedo *et al.*, 2010; Senasica, 2012).

2.1.3. Geographical distribution

H. lauri is considered endemic to Mexico and with center of origin in Central America. Presents restricted distribution in countries such as Mexico, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Guatemala, Colombia, Brazil, Ecuador and Peru. Wide distribution in countries such as Belize, Panama, Venezuela and Guyana (EPPO, 2012, Senasica, 2012).

Figure 1. Adults, female and male, of *Heilipus lauri* on fruit of avocado (Photo: Caicedo, A.M. and Torres, L.F., 2013).

2.1.4. Damage

Its importance is based on the direct damage caused by adults to the avocado fruits in the feeding process on the epidermis and pulp of the fruit (Figure 2), drilling a hole and ovipositing in bored holes (Figure 3). In addition, adults feed on tender buds and foliage.

Figure 2. A. fruits of different size with damage by *H. lauri*. **B.** Fruit with damage from feeding. **C.** Damage in pulp and seed by *H. lauri* (Photos: Caicedo, A.M. and Torres, L.F., 2013).

Figure 3. Perforation with oviposition of *H. lauri* (Photo: Valencia, E. and Caicedo, A.M., 2013).

2.1.5. Host plants

*H. lauri is c*onsidered as a kind monóphagous species that feeds exclusively on native and commercial cultivars of *P. americana* (Castañeda-Vildózola, 2008). However, Castaneda- Vildózola *et al.* (2009) found specimens in Mexico feeding of the native species *P. schiedeana*. In Colombia no record of this insect in other species of Lauraceae is yet known.

2.1.6. Biology, behavior and morphology

The seed borer is characterized by feeding on leaves and fruits of native species and commercial avocado. Its habit is diurnal and adults are most active during the period of gestation. In addition, present the behavior of pretending to be dead for a long time as a defense mechanism (Caicedo *et al.,* 2010; Carabalí, 2013).

2.1.7. Biology

2.1.7.1 Egg

The size of the eggs is 1.4 mm in length and 0.87 mm wide. Newly oviposited eggs are bright greenish white and with the time of development of the embryo becomes light brown to dark brown. The surface of the chorion is finely reticulated and with pentagonal shapes (Castañeda-Vildózola *et al.*, 2013) (Figure 4).

Figure 4. Egg of *H. lauri* (Photo: Valencia, E. and Carabalí, A., 2013).

The eggs are deposited individually in the hole drilled with the *rostrum* or beak (Figure 5A) and with the same; it pushes it very near the seed (Figure 5B). The entrance of the hole eventually is covered with residues of the drilling and with oral secretions. In the field, between one to three holes per fruit with an egg inside have been observed (Castaneda-Vildózola, 2008). In the laboratory, the incubation period of eggs was on average 11 days (10-13 days) (Castañeda-

Vildózola, 2008), which coincides with what we found by Garcia (1962) (cited by Castañeda- Vildózola, 2008) of 12.96 days.

Figure 5. A. Female drilling. **B.** Female ovipositing. **C.** Oviposition (Photos: Carabalí, A.).

2.1.7.2 Larva

The newly emerged larvae initiate the process of feeding, drilling the pulp to reach the seed, where they are housed in the cotyledons and stays all the larval period without destroying the seed, because it is used for the formation of the pupa and the subsequent development of the adult state (Figure 6).

Figure 6. Avocado seed with damage of *H. lauri*. (Photo Caicedo, A.M. & Torres, L. F.)

Another feature of this stage is cannibalism, which explains why there are one or two larvae per seed, housed in each cotyledon. Castaneda-Vildózola (2008) determined by the measurement of the cephalic capsule, that *H. lauri* goes through four larval stages in an average time of 48 days (44-55 days) (Figure 7).

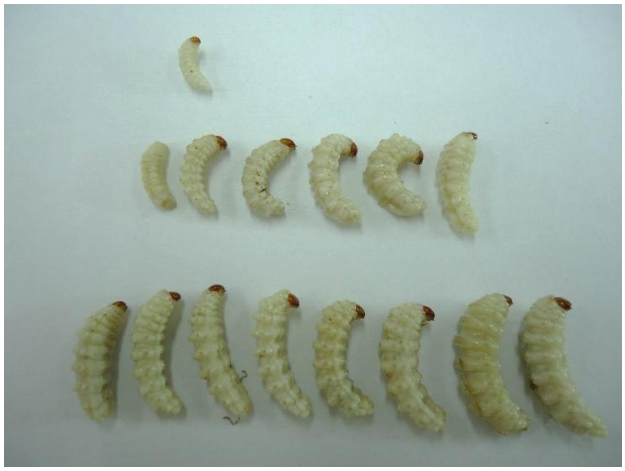


Figure 7. Larvae of *H. lauri* (Photo: Caicedo, A.M. and Torres, L.F., 2013).

The fourth instar larvae reaches a length of 24.2 mm. The body is robust, curved and opaque white. The cephalic capsule is 1,87 mm in length on average, slightly brown in color and is located above the prothoracic segment. Presents conical rudimentary antennas. The epicranial suture is visible throughout its length and the front suture is in a U shape with branches forming a lobe. The abdomen is composed of nine segments; segments from I to VII have a pair of spiracles, and the VIII, a dorsal spiracle. Segment IX has two pairs of dorsal setae. The anus is surrounded by four lobes, the lateral ones with a couple of setae (Castaneda-Vildózola, 2008).

2.1.7.3 Pupa

The pupa is oval shape, creamy white color and open, type exarate (Figures 8a and 8B). The larva forms a pupation chamber with walls covered with debris. Its duration is 15 days on average (11-18 days). In this state it is possible to observe sexual dimorphism; females have the longer *rostrum* and reaches the metathoracic coxae; males are shorter and reach the mesothoracic coxae. The pupae are characterized by the chaetotaxy of the *rostrum* and the prothorax in dorsal view, being distinctive characters of the species of the family Curculionidae (Castañeda-Vildózola, 2008; Castañeda-Vildózola *et al.,* 2013)**.**

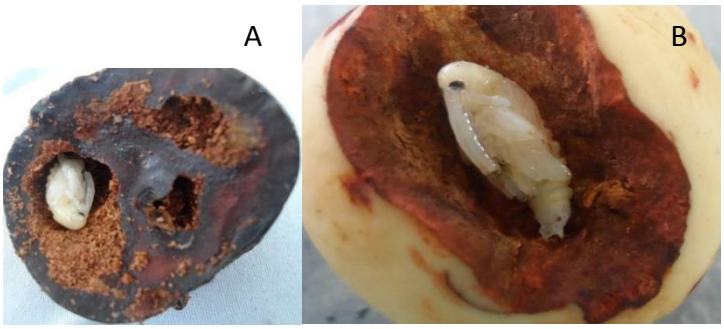


Figure 8. A and **B.** Pupa of *H. lauri* (Photos: Diaz, V., 2013).

2.1.7.4 Adult

Adults are characterized by two pairs of irregularly shaped and elongated opaque orange stripes. The first pair is larger and is located 2/5 of the basis of the elytra, and the second at 1/5 the apex, located almost on the periapical section (Dietz & Barber, 1920) (Figure 9).

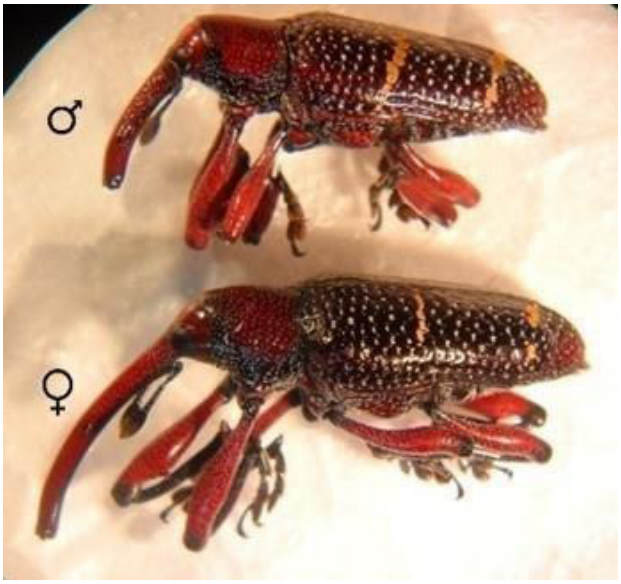


Figure 9. Adult *H. Lauri* (Photo: Carabalí, A. and Valencia, E., 2013)

The integument is opaque, reddish-black and the legs are red. The length of the body (without the face) is 14,77 mm for females and 13,78 mm in males. The *rostrum* is mm and curved in females, and 5.32 mm, short and straight in the males. The eyes are oval. The prothorax reaches a length of 3.59 mm long and 3.86 mm of width in females, and 3.28 mm in length and 3.65 mm of width in males. The final part is constrained, with two mounds in the base with a hard surface; the apical margin is curved and rounded at the base. The angles of the humeral elytra form a humeral callus near the apical third and it has a prominent periapical callus characteristic of the genus *Heilipus* (Castañeda-Vildózola, 2008).

The adult, before emerging from the seed, makes a circular slice in the thin wall with its mandibles, allowing its exit. This process takes place mainly during the hours of the day. The sex ratio obtained in the laboratory was 1:0.9, proportion is very close to 1:1. Adults are diurnal, from 09:00 to 17:00 hours. Mating is very common while the female is drilling the fruits (Castaneda- Vildózola, 2008).

The biology of *H. lauri* is correlated with the phenology of the avocado. Among the factors that favors the presence of this insect is the availability of food throughout the year (fruits and foliage), the diversity of genetic materials and favorable environmental conditions for their development (Castañeda- Vildózola, 2008).

2.1.8 Damage and means of dispersal

Damage is made by the females when drilling the fruits both in the feeding process and in oviposition. The newly emerged larvae start the search of the seed, feeding on the pulp, causing its decomposition and subsequently the partial destruction of the seed, causing the fruit to fall (Carabalí, 2013; Caicedo *et al.*, 2010).

The shape of the drilling in the epidermis is oval, with an average diameter of 4,4 ± 0.8 mm. The number of holes per fruit varies, depending on the level of infestation, being between one to five per fruit (Caicedo *et al.,* 2010). The symptom of damage by *H. lauri* is characterized by the opening hole and the presence of a white exudate that crystallizes in the form of resin (CORPOICA, 2011).

This insect-pest attacks mainly small fruits, of 3-4 cm in diameter in the crown of the tree. In conditions of high infestation, fruits of all sizes are drilled and in all strata of the tree (ICA, 2012; Carabalí, 2013).

The flight capacity under natural condition of this species is unknown. Nevertheless, it is assumed that the main factor for its dispersal is human intervention through the mobilization of infested fruit from one region to another (Carabali, 2013).

2.1.9 Control strategies

2.1.9.1. Biological Control

The only report of natural enemies associated with *H. lauri* was made by Garcia (1962), quoted by Castañeda-Vildózola (2008), who mentions the presence of *Bracon* sp. (Hymenoptera: Braconidae) on larvae in Mexico. In recent studies by the ICA in the collaboration agreement ICA-Colciencias (2013-2014), in the departments of Antioquia and Tolima, found for the first time two species of parasitoids of larvae, belonging to the order Hymenoptera, families Ichneumonidae: Cremastinae (Figure 10) and Braconidae: Helconinae (Figure 11) (Caicedo *et al.*, 2014). In addition, entomopathogenic fungi of the genera *Beauveria* and *Metarhizium* have been isolated.

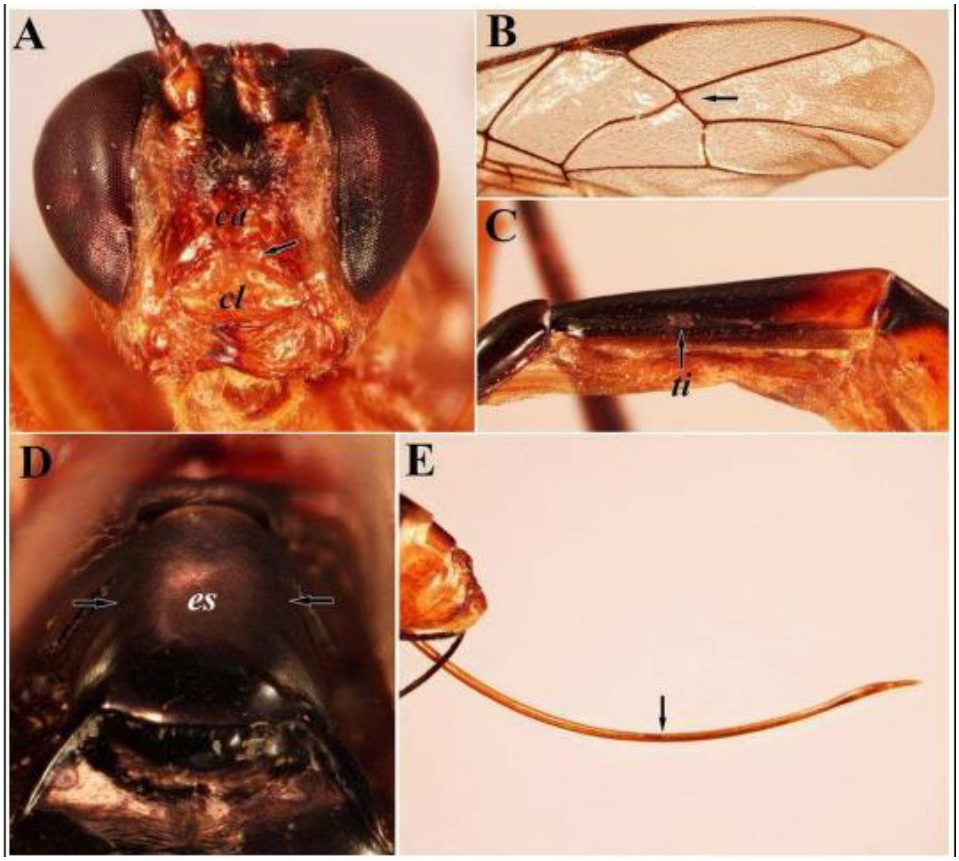


Figure 10. *Xyphosomella* sp. **A.** head frontal view, detail of the Transverse suture between the face (ca) and the clipeus (cl). **B.** Fore wing Detail of the anterior wing indicating the absence of vein 3rs-m. **C.** Detail of the second metasomal tergo with tyridium (ti) separated from the anterior margin of the tergum by a distance of more than four times its own length **D.** scutellum (es) without lateral longitudinal grooves **E.** Ovipositor curved up and winding at apex. (Photos: Dirección Técnica de Análisis y Diagnóstico Agrícola).

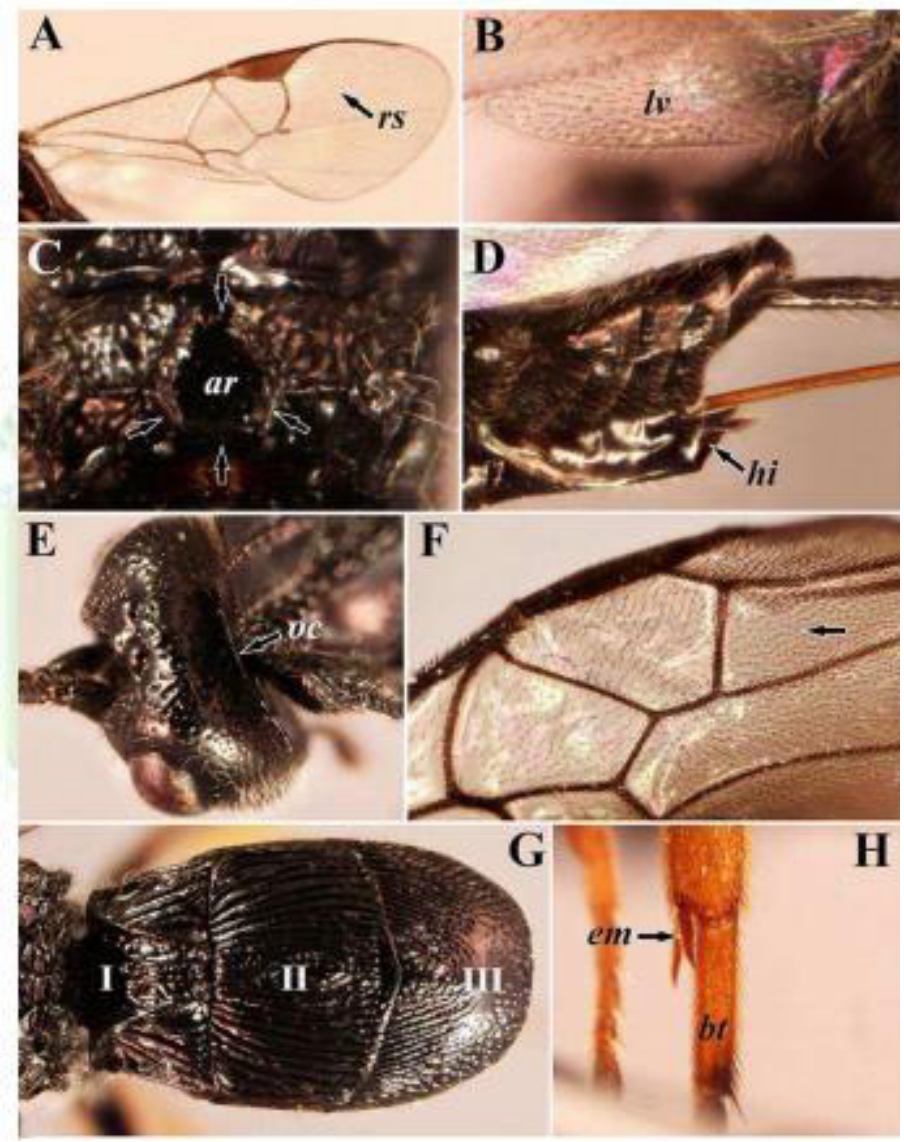


Figure 11. *Eubazus* sp. **E.** head dorso-posterior view with occipital carina (oc) complete **F.** Fore wing Detail of the anterior wing indicating the absence of vein 3rs-m. **G.** Metasoma dorsal view wiith only three visible tergum. **H.** Detail of the apex of the posterior tibia and basitarsus (bt) with the medial tibial spine (em) of a third of the length of the basitarsus. (Photos: Dirección Técnica de Análisis y Diagnóstico Agrícola).

In Mexico it is recommended to apply the fungi *B. bassiana* and *M. anisopliae* in mixture with an additive (agricultural oil), applied to the soil and foliage. This measure helps to prevent and manage populations of *H. lauri*, in combination with the

cultural and chemical control. The application of entomopathogenic fungi should be done with wet conditions of 70-80 % and 25-28 °C, for greater effectiveness (Senasica, 2012).

2.1.9.2. Cultural or mechanical control

In the establishment of a plantation it is recommended the use of planting material from registered nurseries that meet with agronomic quality parameters, genetics and plant required by the ICA and to have a plan for Integrated Pest Management, IPM, under the supervision of an engineer agronomist (ICA, 2012).

In established plantations, recommends the drafting of a pit one meter in depth, for the collection and digging of infested fruits, and covering these with a layer lye and soil of 25 to 30 cm and compacting it (CORPOICA, 2011). The establishment of a system of systematic monitoring to determine the sources of infestation and the implementation of an IPM program is also recommended (Carabalí, 2013).

2.1.9.3. Chemical control

Applications of Thiamethoxam (10g/20L) (Orjuela, 2011; CORPOICA, 2011) showed a reduction of 25 % of fruit affected, after 20 days of application.

2.1.9.4. Economic Impact

H. lauri is considered as one of the main pests of avocado in Colombia, because of their eating habits and of oviposition, causing up to 80 % in economic losses (CORPOICA, 2011; Orjuela, 2011).

2.2. Avocado seed borer weevil Heilipus trifasciatus Fabricius (Fabricius)

2.2.1 Taxonomic position

Class: Insecta
Order: Coleoptera
Family: Curculionidae
Subfamily: Molytinae
Tribe: Hylobinii
Genus: *Heilipus*
Species: *Heilipus trifasciatus* (Fabricius) (Figure 12). Ref. Castaneda-Vildózola,2008

2.2.2 Common names

- Barrenador de la semilla del aguacate (Avocado seed borer)
- Seed borer.
- Perforador and Picudo de la semilla del aguacate (Borer and avocado seed weevil, in Colombia (Castaneda-Vildózola et al., 2013).

2.2.3 Host Plants

It feeds on native avocados in Panama (Dietz & Barber, 1920) and Hass avocado in Costa Rica (González-Herrera, 2003, cited by Castañeda-Vildózola et al., 2013). In Colombia, it has been recorded in a single tree native of the municipality of Mistrató, department of Risaralda (Holes & Giraldo, 1984).

2.2.4 Geographical Distribution

H. trifasciatus found in Panama (Dietz & Barber, 1920), Costa Rica (Gonzalez- Herrera, 2003), Nicaragua (Maes, 2004, cited by Castañeda-Vildózola et al., 2013) and Colombia (Rubio et al., 2009).

2.2.5 Biology

Recent studies by Murgas *et al.* (2014), found that adults feed on tender leaves, bark of tender branches and developing fruits. The female perforates fruits with its rostrum to lay one egg per orifice. One to two ovoposition sites are found per fruit. *H trifasciatus* eggs have an incubation period of 12 to 15 days, the larva feeds on the seed of the fruit during 55 to 68 days; once its larval development is completed, it forms a pupation chamber inside the seed; the adult emerges after 15 to 18 days and its lifespan can range from 115 to 130 days. Dietz & Barber (1920) mention that adults have a lifespan of 116 days, and only one generation develops in the field per year.

Adults of *H. trifasciatus* have an approximate length of 12 to 14 mm. Are colored dark red opaque, *rostrum* shorter than that of *H. lauri*. It is characterized by having six opaque yellow spots well defined: four arranged transversely on the elytra, being more noticeable that those of *H. lauri*, and two arranged longitudinally side by side on the prothorax (Figure 12) (Hole & Giraldo, 1984).

Figure 12. Adult *H. trifasciatus* (Photo: Caicedo, A.M. and Torres, L.F., 2013).

2.2.6 Damage

Adults feed on fruits, leaves and shoots. Females drilled the fruit for oviposition; larvae feed on the pulp to reach the seed. Between one and four larvae per seed can be found. The pupation occurs within the seed (Dietz & Barber, 1920) (taken from Castañeda-Vildózola *et al.*, 2013).

2.2.7 Control Strategies

2.2.7.1 Cultural or mechanical control

The same management is recommended as for *H. lauri*.

2.2.7.2 Biological and chemical control

The presence of natural enemies of *H. trifasciatus* have not been recorded. The effect of chemicals on the management of populations of this pest species is also unknown, so that strategies of cultural control are fundamental for its management.

2.2.8 Economic Impact

The economic impact of this species is unknown on the commercial plantations of avocado in Colombia.

2.3 Avocado moth *Stenoma catenifer* Walsingham

2.3.1 Taxonomic position

Class: Insecta
Order: Lepidoptera
Family: Oecophoridae
Subfamily: Stenomatinae
Tribe: Hylobinii
Genus: *Stenoma*
Species: *Stenoma catenifer* Walsingham

2.3.2 Common Names

- Avocado seed moth (English).
- Barrenador del aguacate (borer of avocado) (Mexico - Spanish).
- Taladrador del aguacate (Driller of avocado) (Spanish - Venezuela).
- Barrenador del palto (Borer of avocado) (Spanish).
- Polilla del fruto del palto (Avocado fruit moth) (Spanish)
- Oruga de la semilla del aguacate (avocado seed worm) (Spanish)

- Barrenador del hueso y del tallo del aguacate (Avocado Seed and stem borer) Spanish
- Pasador del fruto del aguacate (Avocado fruit borer) (Colombia)
- Chinille de la graine de l àvocatier (French)
- Lagarto do fruto (Portuguese)

2.3.3 Host Plants

The species *S. catenifer* is reported as a pest species of the Lauraceae family, being the species *P. americana* Mill. the only one of economic importance (CABI, 2014).

2.3.4 Geographical Distribution

Continente	Países con presencia de la plaga
Norteamérica	México (Restricted distribution)
América Central y el Caribe	Bélice, Costa Rica (Restricted distribution), El Salvador, Guatemala, Honduras, Nicaragua y Panamá.
Suramérica	Argentina, Brasil, Colombia, Ecuador, Guyana, Perú y Venezuela.

CABI, 2014

2.3.5 Biology

2.3.5.1 Egg

Females deposit their eggs on the invaginations on the fruits, in the peduncle and on the stems. The eggs are small and oval, its size is 0.59 mm long by 0.38 mm wide, approximately (CABI, 2014). They possess a rough surface with longitudinal wrinkles; initially are of clear green color that passes to creamy white, and next to the hatching acquire a dark color (Orjuela, 2011); the egg stage lasts about 5.5 days.

2.3.5.2 Larvae

In their larval state passes through five instars without marked differences, but with several variations in color from white, brown, pink to purple in the back and blue in the belly (Figures 13A and 13B). The larvae of the early instars consume the pulp of the fruit, while the fourth and fifth instar feed on the seed, causing losses up to 80 % of the harvest (Orjuela, 2011).

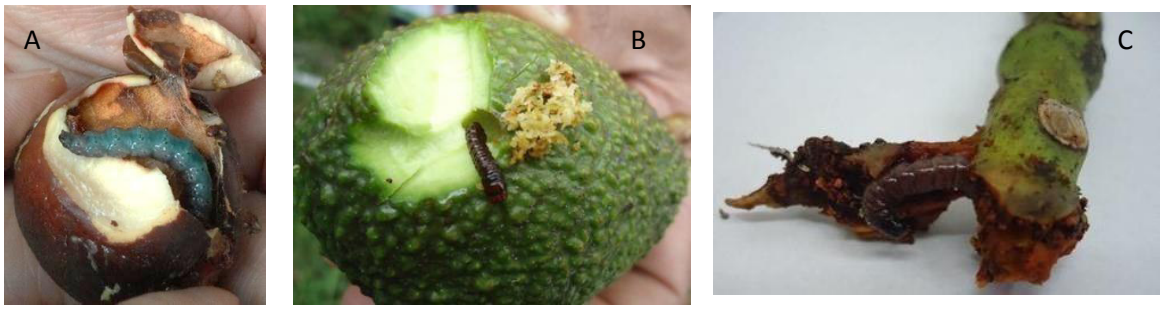


Figure 13. Larvae of *S. catenifer* feeding on fruit and branches. (**A** and **B**) damage to seed and fruit. (**C**) Larva feeding on branch (Photo: Valencia, E. and Caicedo, A.M., 2013).

2.3.5.3 Pupae

The pupae has a size of 10 mm long; can eventually pupate within the seed of which it has fed; however, most of the time the pupa is formed on the ground (Hoddle, 2011; Manrique, 2010). The pupa state has an approximate duration of 14.1 days (Orjuela, 2011).

2.3.5.4 Adult

The adult is a moth of light brown color, with an average length of 15 mm for the female and 11 mm for the male; the forewing is twice as long as it is wide (Figures 14A and 14B). When it is at rest around 25 black spots are observed on the wings that form slanted S shape (Hohmann *et al.*, 2000). On average they live 5.57 days; it is nocturnal and oviposits at night.

Figure 14. A. *S. catenifer* adult with wings outstretched. **B.** *S. catenifer* adult at rest (Photos: Valencia, E. and Carabali, A., 2013)

2.3.6 Damage

The moth of the seed of the avocado *S. catenifer* is a species of economic importance in the cultivation of Hass avocado, by the restrictions that causes to the export of fresh fruits and by the significant impact of the management practices used for their control (adapted from Téliz and Mora, 2007).

The main damage from *S. catenifer* is caused by the larvae feeding internally in the pulp and the avocado seed, which damages the fruit and cause its fall (Núñez, 2008). Larvae also bore stems and terminal buds (Figures 15 and 16) (Wolfenbarger and Colburn, 1966).

Females normally oviposit individual eggs or in groups on the corrugated parts of young branches, on the peduncle or on the fruit (Orjuela, 2011). After hatching the egg, the larva performs a short route to then drill the fruit, leaving the entry hole visible. It is directed to the pulp, passes to the seed and destroys it. A female can come to affect between 8 and 12 fruits (Orjuela, 2011).

Figure 15. Damage done by *Stenoma catenifer* both in the seed of the avocado as in branches of the tree (Photos: Valencia, E. and Caicedo, A.M., 2013).

Figure 16. Damage by the presence of larvae of *S. catenifer* and external aspect of affected fruit (Source: Hoddle, M., 2011). B. damage to branch (Source: González, 2011)

Once having done the damage to the seed, the larva exits through the same port of entry and falls to the ground, where pupates. The pupae can burrow up to a centimeter (1) in the ground (Orjuela, 2011). Damage is evident and can be observed in affected fruits, characterized by whitish exudates and accumulation of droppings on the entry hole (Figure 16). It is possible that the fruits infested with larvae of *S. catenifer* fall prematurely to the ground, where the larvae continue feeding of the seeds before leaving the fruit for pupating on the ground. This species also affects green branches (Hoddle, 2011).

2.3.7 Means of dispersal

The main method of dispersal of this species pest is the mobilization of planting material, fruits and of infested propagating material, packaging and the bad disposal of infested fruits with presence of the moth.

2.3.8 Control Strategies

For the management of the populations of *S. catenifer* it is recommended to use planting material from sites registered with the ICA. The implementation of monitoring plans allows identifying the timely presence of the insect or recognizing the signs or symptoms associated with it.

The sanitary pruning and the timely collection of the fruits are consolidated as crop management practices that interfere with the development of *S. catenifer.*

Collect fruits from affected trees and on the ground, burying them outside the field to a minimum depth of 50 cm, is a strategy for the decline of the populations (Orjuela, 2011).

Chemical control can be considered as an option when the borer insect populations are high, as well as the use of biological controllers (Orjuela, 2011). Hoddle (2011) reported natural enemies *Cotesia* (*Apanteles*) spp., *Dolichogenidea* sp., *Hypomicrogaster* sp., *Chelonus* sp., *Hymenochaonia* sp., *Trichogramma* sp. and *Macrocentrus* sp. In Colombia, larvae parasitized by *Diadegma* sp. (Ichneumonidae: Campopleginae) (Figure 17) and *Dolichogenidea* sp. (Braconidae: Microgastrinae) (Figure 18) were found in Eastern Antioquia and the north of Tolima.

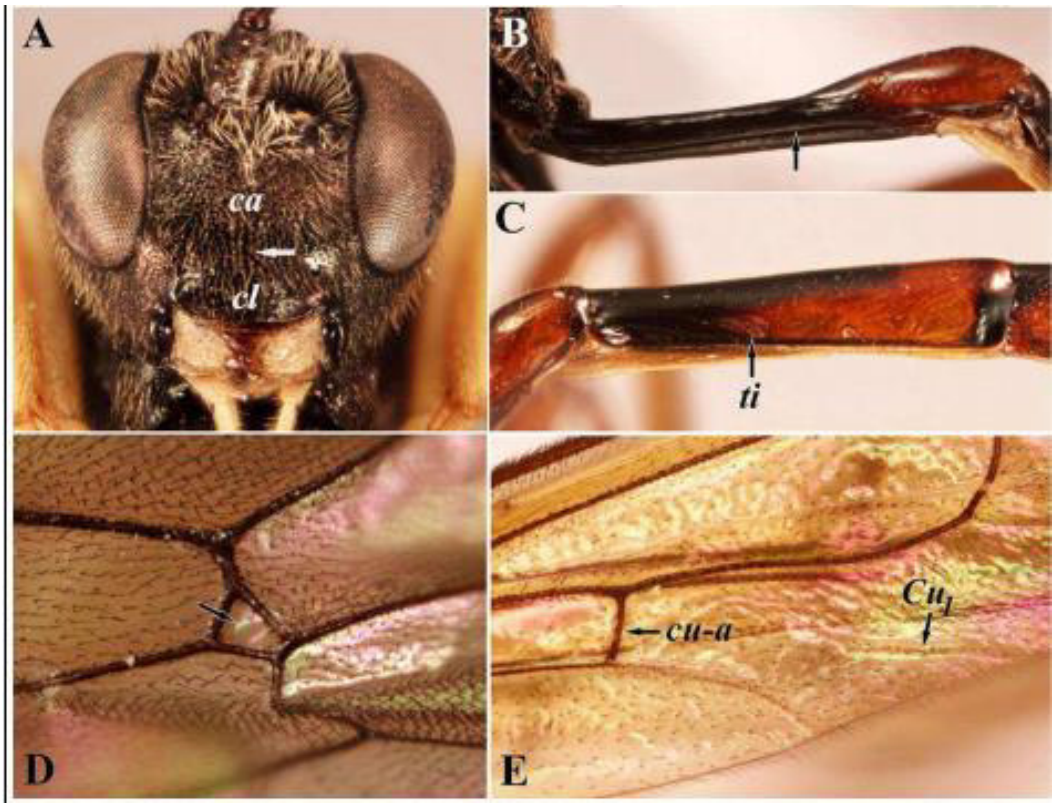


Figure 17. *Diadegma* sp. **A.** head frontal view, detail of the Transverse suture between the face (ca) and the clipeus (cl). **B.** Detail of the first metasomal segment showing the tergosternal suture located in ventro-lateral position. **C.** Detail of the second metasomal tergum with tyridium (ti) separated from the anterior margin of the tergum by a distance of more than twice its own length. **D.** Detail of the petiolate aerolet in the hind wing. **E**. Posterior wing showing the Cu1 vein interrupted before making contact with the cu-a vein. (Photos: Dirección Técnica de Análisis y Diagnóstico Agrícola).

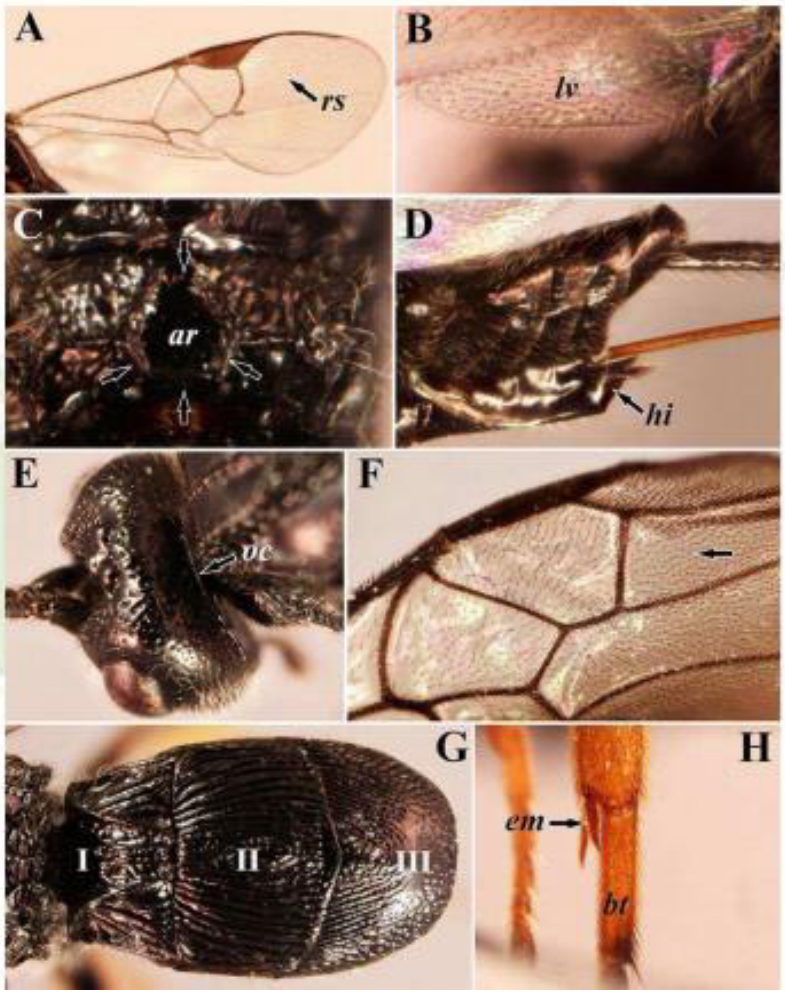


Figure 18. A-D. *Dolichogenidea* sp. **A.** Hind wing detail showing The vein Rs straight. **B.** Detail of the vanal lobe (lv) completely completely surrounded by setae. **C.** Detail of the propodeum showing the areola (air) completely bordered by carinas. **D.** Hipopigium (hi) with expandable folds.

3 SURVEILLANCE ACTIVITIES FOR AVOCADO QUARANTINE SPECIES IN THE FIELD

3.1. Methodology implemented for the monitoring of quarantine pests in places of production of Avocado.

The implementation of the surveillance system for the recognition of free places contemplates: Initially, the buffer area of 1 km is determined around each interested production site; from the perimeter of the place of production (area planted with avocado) that previously the field technicians have calculated by means of the GPS conFigured with the Datum WGS 84 and units of decimal degrees, proceed to do the following:

The gpx file containing the perimeter of the interested place of production is obtained (Hass avocado crop) (Figure 19) example:

Place of Production El Carmelo

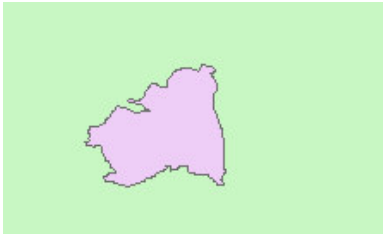


Figure 19. Perimeter of the production place on interest

Starting from the perimeter of the place of production, the 1km zone (buffer) is calculated through the GIS (Geographic Information System) software: (Figure 20) example:

Place of Production El Carmelo and 1 Km Buffer Area

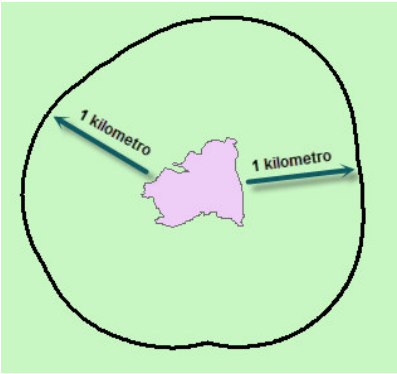


Figure 20. Calculus of the buffer area of 1km

When other nearby place of production enters to the program same procedures described in steps 1 and 2 are done (Figure 21) example:

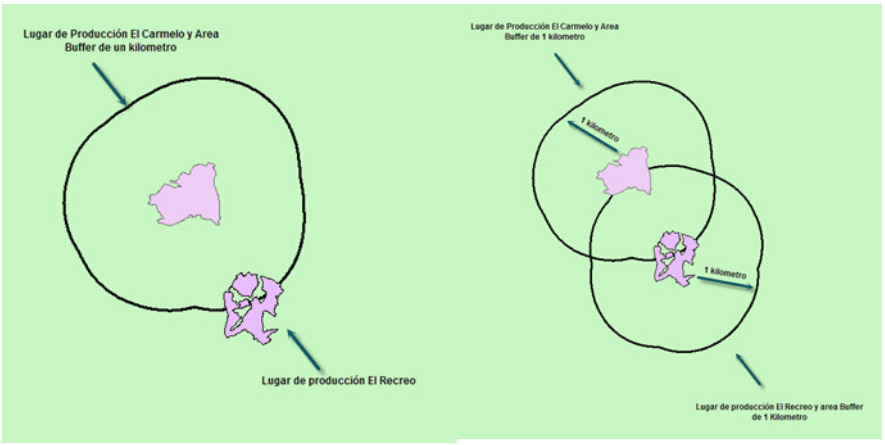


Figure 21. Calculus of the buffer area of 1km with a different production place.

The way in which the overlapped buffer zones are being managed is described as follows:

When the buffer zones of two places of production overlap like in the previous example, the procedure using GIS (Geographic Information System) it is applied a “dissolve” of two buffer areas and it is worked as a single area, as shown in the following figure 22.

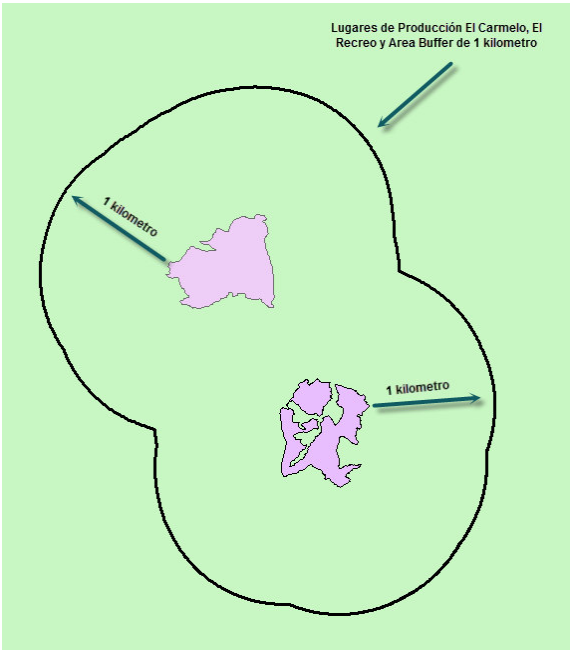


Figure 22. Calculus of the buffer area of 1km with two production places

Once the buffer area is calculated, the cadastral layer is assembled to perform the Cadastral Census in order to determine in the concerned area which lands have avocado and which ones do not (Figure 23).

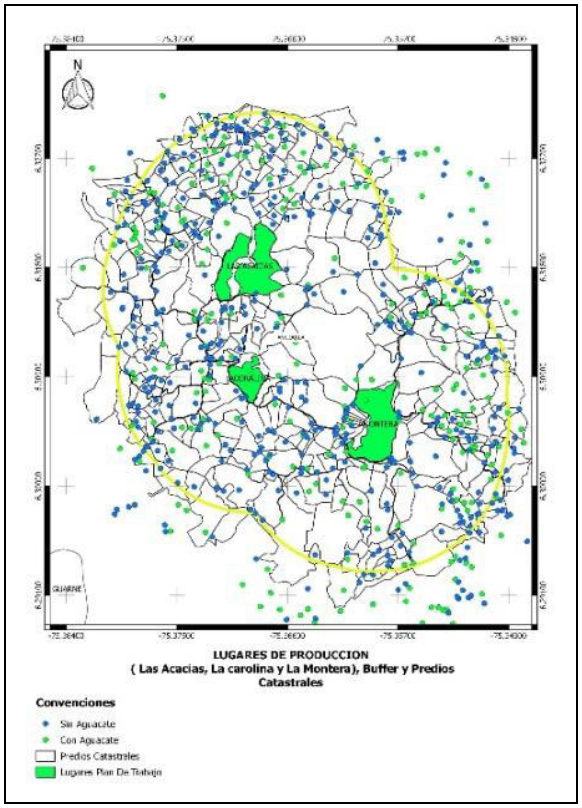


Figure 23. Cadastral Cover

In each place of production of Hass avocado, non-Hass avocado and backyards (1-5 avocado trees) a survey for producers designed by the Technical Direction of Epidemiology and Surveillance for Plant Health is made (Forma-3-1057). Subsequently, the perimeter of the area planted with avocado is taken, in each of the properties of the buffer area, with the GPS configured in Datum WGS 84 and in units of decimal degrees.

Once the number of lands with avocado has been determined, the phytosanitary inspection process is carried out to determine the presence of the quarantine pests (Form 3-1059), after which the pest eradication work begins in the farms within the buffer that are positive. Periodic monitoring will be maintained, both at the production site and at the sites located in the buffer area, to verify the condition of the pest and ensure the effectiveness of the prevention and eradication programs (Figure 24).

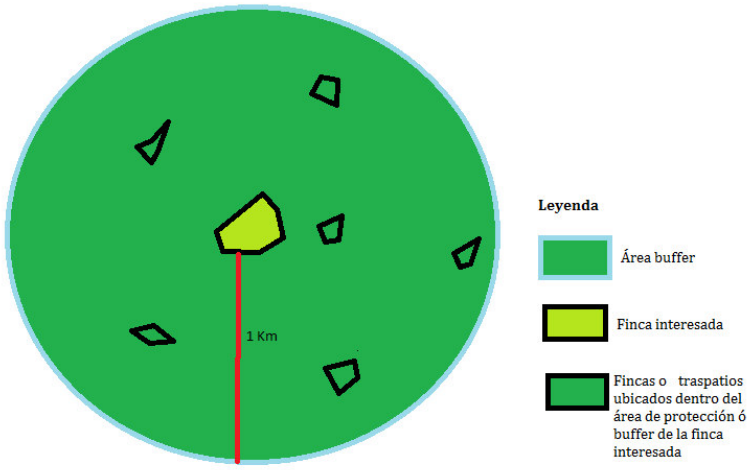


Figure 24. Scheme of places in the work plan and grounds of the buffer area with avocado

The sample size of trees to be sampled in each place of production and in all places of production that are located in the buffer area, is calculated by applying the formula: 10% of the planted area, 15 trees per hectare and visually revising ten (10) fruits per tree; in the backyards all trees are evaluated. In the places between 0-10 hectares 15 trees are evaluated. The selection of trees in the field are performed at random, following a pattern of travel in Z, X or W. Each month that repeats the surveillance the field is entered by a different place to avoid sampling errors (Figure 25).

The inspection to determine the presence of adults of *H. lauri* and H. *trifasciatus* is performed in each one of the trees selected, and in each cardinal point is placed on the floor a canvas of white color of 3m x 1,5m and it is proceeded to shake the branches to allow the fall of adult insects. Eight branches shall be sampled for each cardinal point. The insects collected were preserved in labelled vials and with 70% alcohol (Figure 25). If a single individual is seen, it reported as positive and if there is no individual nor fruits affected, it is recorded as negative.

To determine the presence of S. *catenifer* all the branches of the tree are visually inspected, if a single branch present the symptoms the place of production or any places of production and backyards of the buffer área, which presnt the syntoms of damage is recorded as positive. Additionally, four branches of each tree, one for each cardinal point, the number of individuals, and the stages of development found is specified (Figure 25).

The inspection of the fruits is done by looking at 10 fruits per tree with or without symptoms of damage in the different strata (high, medium and low) of the three species of insects. Finally, of each place of production and backyards are selected fruits suspects or with damage and are placed in a clean area to proceed to cut into slices, including the seed to check for the presence of the immature stages of the pests of interest. Fruits from the ground are also collected, even when they do not have symptoms of damage, and are cut to verify the presence of the pest.

The sampling frequency for each place of production is 30 days (in each place of production sampled trees between one month and the next are not repeated), which allows a greater number of sites sampled per person during a year.

The positive trees to any of the quarantine pests are marked with a yellow colored tape the producer is notified of their presence. Likewise, the detected outbreak is delimited in order to implement the eradication actions.

The detection of one or more quarantine pests in backyards located within the buffer area will activate a pest management plan which should be implemented immediately. This will not affect the continuity of the time period required for a production site to be declared free of pests unless corrective actions are not taken. These measures may include additional delimitation monitoring, appropriate pesticide treatments and the removal of infested host material.

Of the positive sites to any of the species a sub-sample of fruits or branches is taken with symptoms of damage or with individuals in larval state and taken to rearing conditions for obtaining adult specimens, for its subsequent taxonomic identification (Figure 25). All samples enter the laboratory with a duly completed form with all the appropriate information.

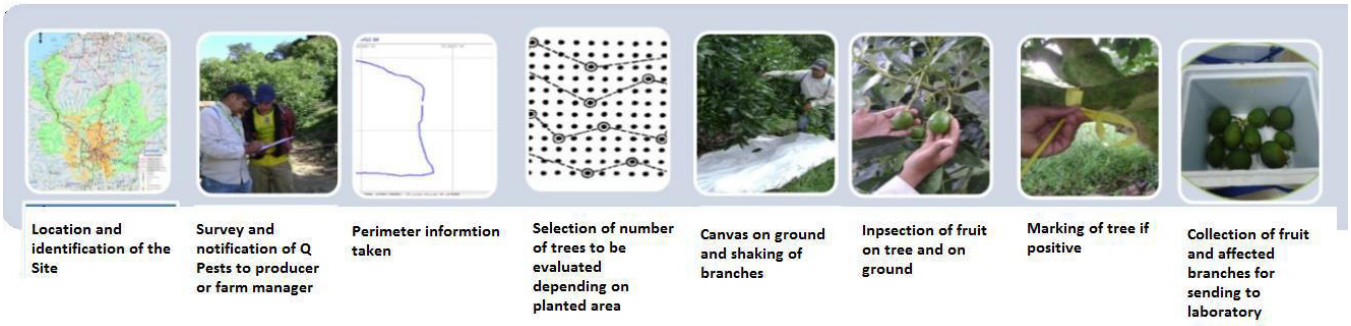


Figure 25. Outline of monitoring carried out in the field.

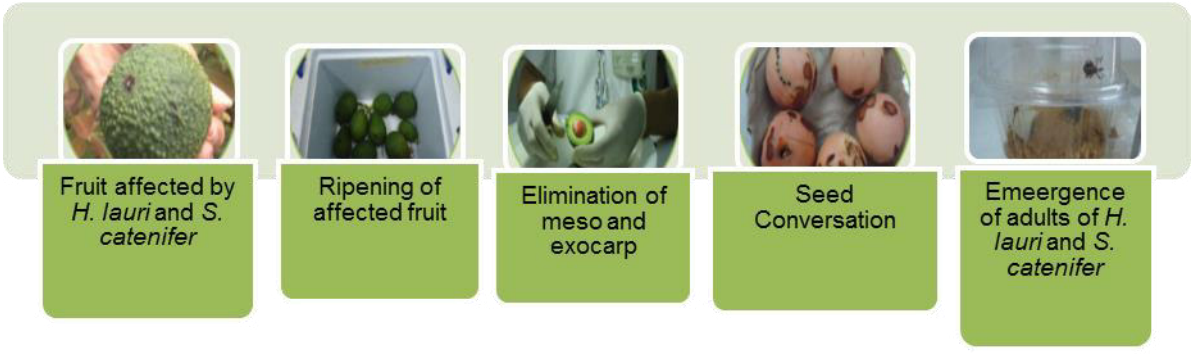


Figure 26. Implementation for obtaining specimens of the quarantine species for subsequent taxonomic identification.

In the facilities of the local office of the Rionegro ICA, all the fruit and branches with symptoms of damage and the presence of immature stages are processed.

The fruits of each places of production are entered in boxes duly labeled boxes until their ripening. Once this process is completed, it facilitates the cutting of these for the revision of the pulp to determine the presence of eggs or larvae. If there are larvae of *Heilipus* or *Stenoma*, it is proceeded to introduce them into healthy seeds to continue their biological development up to the acquisition of the adults.

Seeds with *Heilipus* larvae are separated from seeds that have *Stenoma* larvae and are placed in a transparent plastic container with a 7x10x7cm lid with sawdust or absorbent paper in the base, properly labeled. If live pupae are found, they should remain in the box until adult emergence. Adults of *Heilipus* that are emerging are stored in vials with alcohol at 70% for their diagnosis and adults of *Stenoma* are entered in a killing jar (with cyanide).

The identification of *S. catenifer* is done with the adult state, since the 25 black spots in an "S" shape, is the more reliable characteristic for its identification. In the case of individuals are without scales, it is proceeded to their identification to family level by wing venation and the analysis of genitalia to identify the species.

The information recorded for each place of production, all production sites and the backyards of buffer area, are entered in weekly in Excel workbooks by department and the formats in physical rest in the files of each deparment office. Monthly, consolidated information is sent to the email of the Technical Direction: epidemi.agricola@ica.gov.co

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ADENDDUM/ADENDA

ADENDDUM: SURVEILLANCE PROTOCOL FOR QUARANTINE PESTS *Heilipus lauri, Heilipus trifasciatus* and *Stenoma catenifer* AT HASS AVOCADO PRODUCTION SITES AND THEIR BUFFER AREA.	**ADENDA: PROTOCOLO VIGILANCIA PLAGAS CUARENTENARIAS *Heilipus lauri, Heilipus trifasciatus* y *Stenoma catenifer* EN LUGARES DE PRODUCCIÓN DE AGUACATE HASS Y SU ÁREA BUFFER**
Effective Date:	**Fecha Efectiva:**
Andrea Simao Assistant Deputy Administrator Plant Protection and Quarantine Animal and Plant Health Inspection Service Riverdele, Maryland **Date:** Jun 26, 2019	**Jaime Cárdenas Lopez** Subgerente de Protección Vegetal Instituto Colombiano Agropecuario Bogotá, Colombia **Fecha:**

Section	**Approved text**	**Sección**	**Texto aprobado**
3.1 Methodology implemented for the monitoring of quarantine pests in places of production of Avocado. Paragraph 9.	The places of production and 15% of the premises in the buffer area with the presence of avocado trees will be monitored monthly. Each month will change the premises to monitor in the buffer area, ensuring that those not be repeated and covering the 100% of the buffer area after seven (7) monitoring services. The sample size of trees to be sampled in each place of production and in the premises that are located in the buffer area is calculated by applying the following relationship: 10% of the planted area, 15 trees per hectare and visually revising ten (10) fruits per tree; at backyards all trees are evaluated. In the places between 0-10 hec-	3.1 Metodología implementada para la vigilancia de plagas cuarentenarias en lugares de producción de aguacate Hass. Párrafo 9.	Se vigilarán mensualmente los lugares de producción y el 15% de los predios del área buffer con presencia de árboles de aguacate. Cada mes se cambiarán los predios a vigilar en el área buffer, de forma que estos no se repitan y se cubra el 100% del área buffer después de siete (7) monitoreos. El tamaño de la muestra de los árboles a muestrear en cada lugar de producción y en los predios que se encuentran en el área buffer, se calcula aplicando la siguiente relación: 10% del área sembrada, 15 árboles por hectárea y revisando visualmente diez (10) frutos por cada

	tares, 15 trees are evaluated. The selection of trees in the field is performed at random, following a pattern of travel in Z, X or W (Figure 25).			árbol; en los traspatios se evalúan la totalidad de árboles. En los lugares entre 0-10 hectáreas se evalúan 15 árboles. La selección de los árboles en campo se realiza al azar, siguiendo un patrón de recorrido en Z, X o W (Figura 25).
3.1 Methodology implemented for the monitoring of quarantine pests in places of production of Avocado. Paragraph 10.	Four branches shall be sampled for each cardinal point. The insects collected are preserved in labeled vials and with 70% alcohol (Figure 25). Note: If a regulated pest is observed in any branch during the branch sampling, this sampling point is recorded as positive, otherwise it is recorded as negative.		3.1 Metodología implementada para la vigilancia de plagas cuarentenarias en lugares de producción de aguacate Hass. Párrafo 10.	Se muestrean cuatro ramas por cada punto cardinal. Los insectos colectados se conservan en viales etiquetados y con alcohol al 70% (Figura 25). Nota: Si durante el muestreo de ramas se observa la presencia de una plaga regulada en cualquier rama, este punto de muestreo se registra como positivo, en caso contrario se registra como negativo.
3.1 Methodology implemented for the monitoring of quarantine pests in places of production of Avocado. Paragraph 11.	To determine the presence of *S. catenifer* all branches of the tree are visually inspected, and in the case of detecting the pest, the number of individuals, and its stages of development will be determined and recorded (Figure 26).		3.1 Metodología implementada para la vigilancia de plagas cuarentenarias en lugares de producción de aguacate Hass Párrafo 11.	Para determinar la presencia de *S. catenifer* se inspeccionan de manera visual todas las ramas del árbol, y en caso de detectar la plaga se determina el número de individuos y su estado de desarrollo (Figura 26).
3.1 Methodology implemented for the monitoring of quarantine pests in places of production of Avocado. Paragraph 12.	Fruit sampling looking for any of the three quarantine pests, is conducted by taking from the cardinal points 10 fruits per tree. The suspect fruits, from the tree or the soil, will be cut into slices, including the seed.		3.1 Metodología implementada para la vigilancia de plagas cuarentenarias en lugares de producción de aguacate Hass. Párrafo 12.	La inspección de los frutos se realiza observando 10 frutos del árbol de los diferentes puntos cardinales y se busca la presencia de cualquiera de las tres plagas cuarentenarias. Los frutos sospechosos, del árbol o del suelo, serán cortados en rodajas, incluyendo la semilla.
3.1 Methodology implemented for the monitoring of quarantine pests in	The sampling frequency for each place of production is monthly (in each place of production, sampled trees		3.1 Metodología implementada para la vigilancia de plagas cuarente-	La frecuencia de muestreo para cada lugar de producción tendrá una periodicidad mensual

places of production of Avocado. Paragraph 13.	between one month and the next are not repeated), which allows a greater number of sites sampled per person during a year.		narias en lugares de producción de aguacate Hass. Párrafo 13.	(en cada lugar de producción no se repiten árboles muestreados entre un mes y el siguiente), lo cual permite un mayor número de sitios muestreados durante el año o temporada.
3.1 Methodology implemented for the monitoring of quarantine pests in places of production of Avocado. Paragraph 21.	The surveillance data collected from the nuclei (places of production and its buffer area) are uploaded in the *SISFITO HASS* application. It is an application developed by ICA to store the phytosanitary information that supports Hass avocado exports. *SISFITO HASS* integrates databases with the visualization of perimeters of the production areas by using google maps and generates reports in PDF and Excel format.		3.1 Metodología implementada para la vigilancia de plagas cuarentenarias en lugares de producción de aguacate Hass Párrafo 21.	Los datos de la vigilancia realizada a los núcleos (lugar de producción priorizado y su área buffer), se sistematizan en el aplicativo SISFITO HASS, desarrollado por el ICA para almacenar la información fitosanitaria soporte de las exportaciones de aguacate hass. Este integra bases de datos con visualización de perímetros de área cultivada por medio de google maps y generación de reportes en PDF y Excel.
3.1 Methodology implemented for the monitoring of quarantine pests in places of production of Avocado.	Those places of production and their buffer areas that according to the surveillance program have two (2) months free of quarantine pests will be authorized.		3.1 Metodología implementada para la vigilancia de plagas cuarentenarias en lugares de producción de aguacate Hass	Serán habilitados los lugares de producción y su área buffer que de acuerdo con el programa de vigilancia tengan dos (2) meses libres de plagas cuarentenarias.
3.1 Methodology implemented for the monitoring of quarantine pests in places of production of Avocado.	In the case of register one of the three quarantine pests in a place of production that has been certified as free from these pests, a 100-meter radius quarantine area will be established surrounding the pest detection point. This quarantined area will be maintained until reaches two (2) months free from the pest as a result of biweekly surveillance. In case of more than one detection occurs during the		3.1 Metodología implementada para la vigilancia de plagas cuarentenarias en lugares de producción de aguacate Hass	Se establecerá una cuarentena de 100 metros alrededor del punto de detección, en caso de presentarse el registro de una de las tres plagas cuarentenarias en un lugar de producción que haya sido certificado como libre de estas plagas. Esta cuarentena se mantendrá hasta que alcancen dos (2) meses libres de la plaga como resultado de la vigilancia quincenal.

	monthly surveillance, the place of production will be kept in quarantine until, as a result of the biweekly surveillance, it reaches two (2) months free of regulated pests.			En caso de presentarse más de una detección en la vigilancia mensual, el lugar de producción se mantendrá en cuarentena hasta que alcancen dos (2) meses libres de la plaga como resultado de la vigilancia quincenal.
	The figure of Authorized Service Provider is allowed as long as ICA performs the respective training and supervision.			La figura de Proveedor Autorizado de Servicios, es permitida siempre que el ICA realice el respectivo entrenamiento y supervisión.