ISSN 2070-836X

APORTE SANTIAGUINO

Revista de Investigación

Volumen 6 n.º 1, enero – junio 2013

Revista Aporte Santiaguino

Aporte Santiaguino Journal

CONTENIDO
Volumen 6 nº 1, enero - junio 2013

CONTENT
Volume 6 nº 1, January - June 2013

ISSN 2070-836X

ARTÍCULOS ORIGINALES

Comportamiento epidemiológico de pacientes reincidentes intoxicados por plaguicidas en el Hospital de Barranca, enero 2000-diciembre 2010. [Epidemiological behavior of recidivist patients poisoned by pesticides in Barranca Hospital, January 2000-December 2010]..... 9
Elizabeth Paredes C., Augusto Olaza M., Yuliana De la Cruz R., Carmen Alvarado Z.

Conocimientos de los efectos secundarios del acetato de medroxiprogesterona en usuarias del Hospital Víctor Ramos Guardia, Huaraz-2011. [Knowledge of the side effects of users medroxyprogesterone acetate in Víctor Ramos Guardia Hospital, Huaraz-2011.]..... 18
Marcelo Arotoma O., Magna Guzmán A., Olga Cayra S., Angel Mendoza L., Willy Córdova C.

El concepto de la renta económica para evaluar el éxito empresarial en la Región Ancash: casos de empresas comerciales, producción y servicios, año 2010. [The concept of income for economic evaluate business success in the Ancash Region: cases of commercial, production and services, year 2010]..... 24
Nelson Cruz C., William Ojeda P.

Uso de indicadores ambientales para la evaluación de la zona contaminada en la Planta de Tratamiento Santa Rosa de Jangas. [Use of environmental indicators for the evaluation of the contaminated zone in the Treatment Plant Santa Rosa of Jangas]..... 33
Aldo Tarazona M., Luis Torres Y.

Determinación de la cantidad de radiación solar incidente en paramentos verticales en $W/m^2h°C$ en diferentes direcciones a partir de la radiación horizontal incidente en la ciudad de Huaraz – Perú. [The radioactive quantity's determination soling incidental in vertical wall fronts in W/m^2h, starting from the horizontal radiation incident in town of Huaraz – Perú]..... 43
Miguel Corrales P., Víctor Villegas Z.

Factores de riesgo relacionados al abandono de métodos anticonceptivos artificiales - Centro de Salud Monterrey - Huaraz, 2012. [Risk factors related to the abandonment of artificial contraceptive methods in Monterrey Health Center - Huaraz, 2012]..... 54
Augusto Olaza M., Yuliana De la Cruz R., Víctor Olaza M.

Análisis de investigaciones enfocadas en las vivencias de las madres adolescentes: una mirada cualitativa desde la crisis situacional, año 2013. [Analysis of research focused on the experiences of teenage mothers: a qualitative look from situational crisis, 2013]..... 66
Mistral Carhuapoma A., Gabriela Samillan Y., Carmen Alvarado Z.

Impacto del funcionamiento de la Universidad Nacional "Santiago Antúnez de Mayolo" en el desarrollo de Barranca y zonas de influencia. [Impact the operation of the National University "Santiago Antúnez de Mayolo" in the development of Barranca and hinterlands]..... 75
Eberth Valverde V., Elmer Gutiérrez L.

Competitividad y facilidad de hacer negocios: comparaciones relativas para Latinoamérica. [Competitiveness and ease doing business: relative comparisons in Latin America]..... 86
Carlos León D.

Parepitragus pulverulentus and *Epitragopsis olivaceus* (Coleoptera: Tenebrionidae) in an ecological olive grove (*Olea europaea* L.) in the central coast of Peru. [*Parepitragus pulverulentus* y *Epitragopsis olivaceus* (Coleoptera: Tenebrionidae) en un olivar ecológico (*Olea europaea* L.) en la costa central del Perú]..... 98
Miguel Anteparra P., Inés Redolfi P., Consuelo Arellano U.

Factores de riesgo asociados a la parasitosis intestinal en niños de una comunidad rural, Chiclayo – Perú. [Factors of risk associated with the intestinal parasitic in children in a rural community, Chiclayo – Peru]..... 108
Nancy Malca T., Víctor Alvitres C.

ENSAYOS

Análisis epistemológico de la matriz de consistencia y la operacionalización de variables. [Epistemological analysis matrix consistency and operationalization of variables]..... 121
Ernesto Hashimoto M.

Humanismo y Medicina. [Humanism and Medicine]..... 133
Ciro Maguiña V.

OPINIÓN

Cambio climático, salud pública y enfermedades infecciosas. [Climate change, public health and infectious diseases]..... 140
Douglas López de G., Jaime Salazar V., Janeth Vera G., Julio Menacho L.

Recibido, 16 / 04 /2013 Aceptado, 08 / 05 /2013 Artículo Original

Parepitragus pulverulentus and *Epitragopsis olivaceus* (Coleoptera: Tenebrionidae) in an ecological olive grove (*Olea europaea* L.) in the central coast of Peru

Parepitragus pulverulentus y *Epitragopsis olivaceus* (Coleoptera: Tenebrionidae) en un olivar ecológico (*Olea europaea* L.) en la costa central del Perú

Miguel Anteparra P. [1a], Inés Redolfi P. [2b], Consuelo Arellano U. [3c]

ABSTRACT

An olive grove of the Seville variety located in an arid zone in the Irrigation Santa Rosa in the Central Coast of Peru, is irrigated by gravity under the system of pit with trees more than 2 years of age, were made monthly evaluations with two systems of capture: traps pitfall on the foot of the tree and white polypropylene bags in the canopy. The olive grove is surrounded by coastal hills within the Ecoregion of the Desert of the Pacific and limits with the National Reserve of Lachay. We have found two species of Tenebrionidae associated with an olive grove, these are *Parepitragus pulverulentus* Erichson and *Epitragopsis olivaceus* Erichson of the subfamily Pimeliinae of the tribe Epitragini. Both species are recorded for the first time in an olive field in Peru. The population of *P. pulverulentus* shows numeric same abundance as much in the base as in the canopy of the tree. *E. olivaceus* is more abundant in the canopy; instead on the basis of their population was low. These two species are associated with the grove olive, since these species are presents only during the critical phenologic states of the culture, appearing during the formation the floral cluster. We think that these species could be feeding on the produced vegetal remainders as they are floral bunch, pollen, petals and vain or not formed fruits.

Key words: Olive; seville variety; Tenebrionidae; *Parepitragus pulverulentus; Epitragopsis olivaceus*, central coast of Peru.

RESUMEN

Un olivar de la variedad de Sevilla ubicado en una zona árida en el riego de Santa Rosa, en la costa central del Perú, cuenta con riego por gravedad en el sistema de fosa, con árboles de más de 2 años de edad. Se realizaron evaluaciones mensuales con dos sistemas de captura: trampas pitfall al pie del árbol y bolsas blancas de polipropileno en la copa del árbol. El olivar está rodeado por lomas costeras dentro de la ecorregión del Desierto del Pacífico y limita con la Reserva Nacional de Lachay. Se ha hallado dos especies de Tenebrionidae asociadas con un cultivo de olivo *Parepitragus pulverulentus* Erichson y *Epitragopsis olivaceus* Erichson, de la subfamilia Pimeliinae de la tribu Epitragini. Ambas especies se registran por primera vez en un campo de olivo en el Perú. La población de *P. pulverulentus* muestra igual abundancia numérica tanto en la base como en la copa del árbol. *E. olivaceus* es más abundante en la copa del árbol, en cambio en la base su población fue escasa. Las dos especies están asociadas con el olivo, ya que estas especies se hallan presentes sólo durante los estados fenológicos críticos del cultivo, apareciendo durante la formación el racimo floral. Se cree que estas especies podrían estarse alimentando de los residuos vegetales producidos como son racimos florales, polen, pétalos y frutos vanos o no formados.

Palabras clave: Olivo; variedad sevillana; Tenebrionidae; *Parepitragus pulverulentus; Epitragopsis olivaceus;* costa central del Perú.

[1] Facultad de Agronomía, Universidad Nacional Agraria de la Selva.
[2] Facultad de Ciencias, Universidad Nacional Agraria La Molina.
[3] University of North Carolina, EEUU.
[a] Ing. Agrónomo, [b] Bióloga, [c] Experimental Statistics.

INTRODUCTION

The olive grove (*Olea europea* L.) is a structurally very simple system, with two layers of vegetation arboreal mainly and herbaceous vegetation, that is generally occasional, with short interactions that many authors consider simple and alimentary chains. Appearing this agrosistem using the classic trophic pyramid with the four groups of components such as primary producers (olive tree and weeds occasional), consumers (phytophagous), secondary consumers and superior levels and decomposes (Morris 1997; Acosta 1998; Lopez et al. 2000). The insects and specifically the coleopterans constitute interesting indicators of the biodiversity of a determined territory, with restricted geographic distribution can be used like more precise markers of some environments (Solervicens 1995; Yeates et al. 2002). In this agrosistem, two species of Tenebrionidae exist as they are *P. pulverulentus* and *E. olivaceus* pertaining to the subfamily Pimeliinae of the Epitragini tribe, that lives in this environment which show population irruptions during the phenologic development of the crop field. In our country numerous studies exist on the distribution of Coleoptera in the Central Coast of Peru which are restricted to the National Reserve of Lachay (Torres and López 1981; Alfaro et al. 2000, Giraldo 2002, Giraldo and Arellano 2003, 2004). The objective of the this work is to know the diversity of the species presents of Tenebrionidae, as well as its abundance and fluctuation in the time in an ecological plantation in an olive trees in the Central Coast of Peru.

The biological and ecological diversity of the coleopterans is extraordinary; taxonomically the beetles constitute more of 40 % of the diversity described for Hexapoda at world-wide level, with approximately 350,000 species described to the date (Arias 2000). The family Tenebrionidae is one of the most numerous of Coleoptera, with more than 14,500 species to world scale and a total of 2,879 species for the region Neotropical (Raven 1988). Tenebrionidae is an important family of entomological fauna of deserts ecosystems (Krasnov et al. 1996; Carpaneto and Fattorini, 2001). It is considered that these insects play a key role in the processes of biological fragmentation of the vegetal resource, in the cycles of the nutrients and the diet of other consuming organisms, especially vertebrates (Semida et al. 2001; Adamopoulou and Legakis 2002; Orgeas et al. 2003; Chen et al. 2004).

The great majority of the species of Tenebrionidae have black colour, some are brown and others of black or brown dark colour and they present marks of red or white colour. They are associated commonly with vegetal materials in decomposition as wood and other remainders of rotted plants, few are phytophagous and plagues of some cultures (Guerin 1953; Raven 1988). Some species of Tenebrionidae are considered possible indicators of climatic conditions (Marcuzzi 1951). The adults and the larvae are saprophytes and they are presents between vegetal rests in decomposition, tinder fungi, in rotten and rusted wood, underneath the crust of the trees, between dry leaves and in nests of birds and mammals, where they eat the organic rest that find. Some members of this family have also been registered in nests of ants or termites so much that many species have adaptations for the life under conditions desert or arid (Tschinkel 1975; Allsopp 1980; Tschinkel 1981; Raven 1988). However, this family has not been appropriately studied, being able to attribute this probably to the fact that they have ended up being constituted in plagues in spite of the great number of species that only includes to a reduced number of these (Raven 1988).

Some authors register to species of Tenebrionidae of the subfamily Pimeliinae of the tribe Epitragini affecting to some cultures recorded as Marcano (1976) who has found a *Epitragus aurulentus* Kirsch producing great damage to different cultures from which consumes young leaves, flowers and fruits such as cherry (*Malpighia punicifolia* L.),

carob tree (*Prosopis juliflora* (Sw.) DC.), orange (*Citrus sinensis* (L.) Osbeck, corn (*Zea mays* L.), mango (*Mangifera indica* L.), pigeonpea (*Cajanus cajan* (L.) Millsp. and fig fruits (*Ficus carica* L.). In Venezuela authors like Arnal and Ramos (1990) inform that adults of *Epitragus* sp. takes refuge in the petals of sunflower's capitulum, can damage leaves and capitulum, this insect is polyphagous and they feed of diverse species of the plants and fungi like *Ustílago scítamínea* Sydow, in plants of sugar cane affected by the illness of the smut. Also Camacho et al. (2002) mention to *E. aurulentus* in guajaba (*Psidium guajaba* L.) feeding on leaves and heartwood. Mazzani et al. (2004) mentioned species of *Epitragus* sp. in corn affecting the cob in high population. In the Caribbean, Mexico and Canter and South America. Hilje et al. (1991) reported to *Epitragus* sp. eating leaves in pigeon wood (*Guazuma ulmifolia* Lam.). Cruz et al. (2001) mentioned to *Epitragus sallaei* (Champion) affecting to mango (*M. indica*) and sweet potato (*Ipomoea batatas* Linnaeus). In Costa Rica in the Area of Conservation Guanacaste (Nilsen et al. 2004) registered to *E. aurulentus*. Gutiérrez et al. (2004) inform that between the main plagues that damage to little plants of tomato are the false wire worm *Epitragus* spp. in Nicaragua. Panhwar (2005) mentioned to *E. sallei* like plague in trees of neem (*Azadirachta indica* A. Juss) in India.

Evenhuis and Eldredge (2003) mentioned species introduced of genus *Epitragopsis* found in plants of *Ipomoea pes-caprae* (L.) R. Br. in Hawaii. Vidal (2006) indicates that *P. pulverulentus* was found in Chile and surrounding areas and Bejsak (2006) includes in his Catalogue of Tenebrionidae species of genus *Epitragopsis* and *Parepitragus* presents in Peru as *Parepitragus ater ater* Kulzer, *P. macrophthalmus* Marcuzzi, *P. marcuzzii* Freude, *P. pulverulentus pulverulentus* Erichson, *P. rossi* Freude, *Epitragopsis peruensis* Freude, *E. olivaceus* Erichson, *E. lucens* = *olivaceus* Erichson, *E. diremptus* Karsch, *E. convexus* Erichson and *E. bothrotiformis* Freude. Also Ferrú and Elgueta (2011) recorded at *P. pulverulentus* and *E. olivaceus* in Peru and Chile.

MATERIALS AND METHODS

Zone of Study

The olive grove of Seville variety has 25 hectares, located to 124 kilometres to the north of Lima city, in the Irrigation Santa Rosa, pertaining to the Company San Fernando S.A. The field is divided in seven lots or parcels, all seeding with olive tree with exception of the lot four that usually is seeded with maize. Located geographically in Latitude (S) 11° 14' 49",

Latitude (W) 77° 25' 43" and Altitude of 350 masl.

The plantation marks are rectangular of 9 x 7 meters, with 9 meter between streets and 7 meters between plants, with a density of 158.7 trees by hectare.

In agreement with the Holdridge System and the Ecological Map of Peru (Holdridge 1960) the zone is barren, represented by deserts with scrubs and mount thorny. The precipitation is smaller to 100 mm per year and the average temperature varies between 16 ° C and 23 ° C. The vegetation is xerophytes and grasses appear in certain times deal year. The water comes from the rivers or the subsoil as it is the case of the Irrigation Santa Rosa. The field is surrounded by coastal hills and limits with the National Reserve of Lachay within the ecoregion of the Desert of the Pacific, contains flora resistant exuberant to long droughts where there 96 vegetal species, 225 insects species, 50 birds species in addition to reptiles and mammals (Brack and Mendiola 2000).

In this zone they dominate grounds of heavy texture with fine sand, until heavy sand, from average depth to superficial, sometimes can display fine gravel until a 35 %, especially those which are located in the base of hills with moderate slopes. In the flattest parts a discontinuity in the profile by the presence of a clay-muddy frank layer in form very located can be found. The pH varies from 7,5 to 8,3 and the level of changeable sodium does not exceed 10 %. The salinity varies gradually between 0,2 to 5,50 dS/m in the low surface and with the depth. The calcareous content varies from 2,2 to 4,0 %,

concentrating itself in the surface (Sánchez 2006).

Field activities

The irrigations were programmed every 20 days, trees were pruned between months of May and June after the harvest, were used fertilizers like nitrate of potassium, monoamonic phosphate, sulphate of magnesium, nitrate of calcium, besides micro elements. Before beginning this work, pesticides were been used like buprofezin for the control of *Palpita persimilis* Munroe, for the control of scales methomil was used; as well as the use of gliphosate to control weeds. Also liberations were made of *Trichogramma* spp. at the rate of 100,000 small wasps by hectare, every 30 days and applications of *Bacillus thuringiensis* at the rate of 100 grams of commercial product by cylinder of 200 litters.

On the foot of the tree there was greater humidity due to the system of irrigation by gravity in wells, therefore a greater vegetal cover of 6,3 up to 8,5 weeds by square meter. The streets were not irrigated and displayed a little vegetal cover of 0,6 to 1 weeds by square meter. The content average of organic matter of the olive grove was of around 1,2 %.

Evaluation in the base of the tree

The evaluations were monthly, at random we chose twelve places that represented whole area, where were placed 12 traps pitfall on the foot of each tree. The pitfall traps were pots of Tecnopor® with 7,5 cm. of high by 5,2 cm in the base, with a diameter of opening of 9 cm. The pots were buried level with the surface of the ground, without covering the entrance mouth and in its interior of water mixed with detergent was placed around 30 millilitres. The pitfall traps were retired after 14 hours of their positioning (between 4:00 to 6:00 p.m. - 8:00 to 10:00 a.m.) agreeing with Morris and Campos (1999) because if one left them by greater time, these were contaminated with dust, another vegetal material or were removed by nuisance birds. The collected material was placed in labelled white plastic bottles of 45 millilitres of capacity, with hermetic cover. In the laboratory specimens were placed in plastic bottles with alcohol to 70 %, for their subsequent identification.

Evaluation in the canopy of the tree

The evaluations were monthly. Five places were chosen at random that represented the whole area. In each place two trees were chosen, each tree was divided in four sides, coinciding with the cardinal points and it is took a sample of each cardinal point, to the height of the chest. In each evaluation point they took 4 samples for each tree, with that which we obtain 8 samples in each place and 40 samples in total. For the collection of the samples, we use white bags of polypropylene 74 centimetres long and 48 centimetres wide. The bag was introduced at random to a chosen branch, closing the bag and shaking the branch, then it was placed inside the bag a cotton flake absorbed with alcohol of 70 %, to kill to the arthropods, later on the air was extracted carefully and finally it se closed the bag with a knot. Each bag with the collected material, it was labelled, registering the tree, and it dates. The collected material was conserved in the polypropylene bags for its analysis in laboratory.

RESULTS

Number of species:

Two species of Tenebrionidae associated with olive grape were collected: *P. pulverulentus* (figure 1) and *E. olivaceus* (figure 2) pertaining to the subfamily Pimeliinae of the tribe Epitragini. Both species have been registered for the first time in olive grape in Peru, although species of *Epitragopsis* and *Parepitragus* have been registered living in our country (Bejsak 2006).

Figure 1. *Parepitragus pulverulentus* (female).

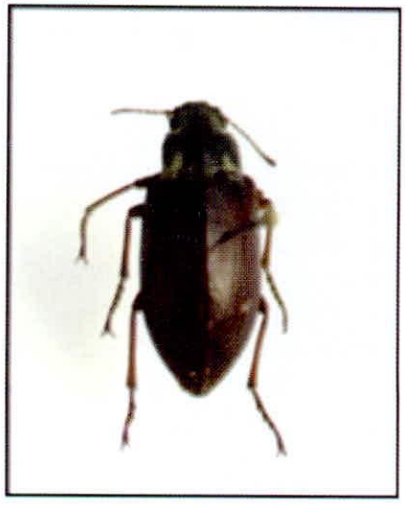

Figure 2. *Epitragopsis olivaceus* (female).

Abundance of species

The species *P. pulverulentus* was more abundant than the species *E. olivaceus*. The number of captured individuals of *P. pulverulentus* was similar as much in the canopy as in the base of the tree. However *E. olivaceus* was more abundant in the canopy that in the base of the tree. In the base *E. olivaceus* was captured only one time (table 1).

Table 1. Number of individuals of *P. pulverulentus* and *E. olivaceus* in an olive grove of the Central Coast of Peru, captured in the base and the canopy of the tree, from May 2004 and April 2005.

P. pulverulentus	May.	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
Base				1		1	4	2	2	1	1	
Canopy				1	1	2	4	1	2		2	

E. olivaceus	May.	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
Base					1							
Canopy					2	5	1		1			

We can observe that the population of *P. pulverulentus* shows same numeric abundance in the base as in the canopy of the tree. The presence of *P. pulverulentus* was detected in August when the formation of the floral cluster begins maintaining it stable population until the month of October, when the formation of the fruit begins. The biggest population was reached in November then they begin to diminish in December and their populations stay stable until the month of March (figure 3).

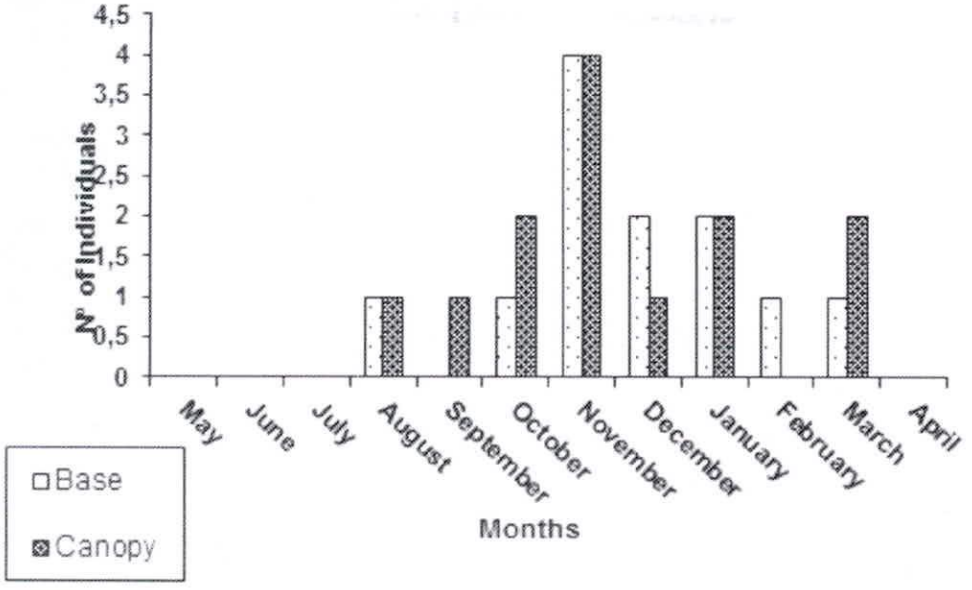

Figure 3. Number of individuals of *P. pulverulentus* in the canopy and the base of the tree in an olive grove in the Central Coast of the Peru during May 2004 and April 2005.

We have observed that *E. olivaceus* is more abundant in the canopy however in the base it was captured only once in September. In the canopy their capture began in the month of September during the beginning of the flowering and its biggest population was observed during the month of October during the formation of the fruit, in November their population diminishes and their presence was detected until January (figure 4).

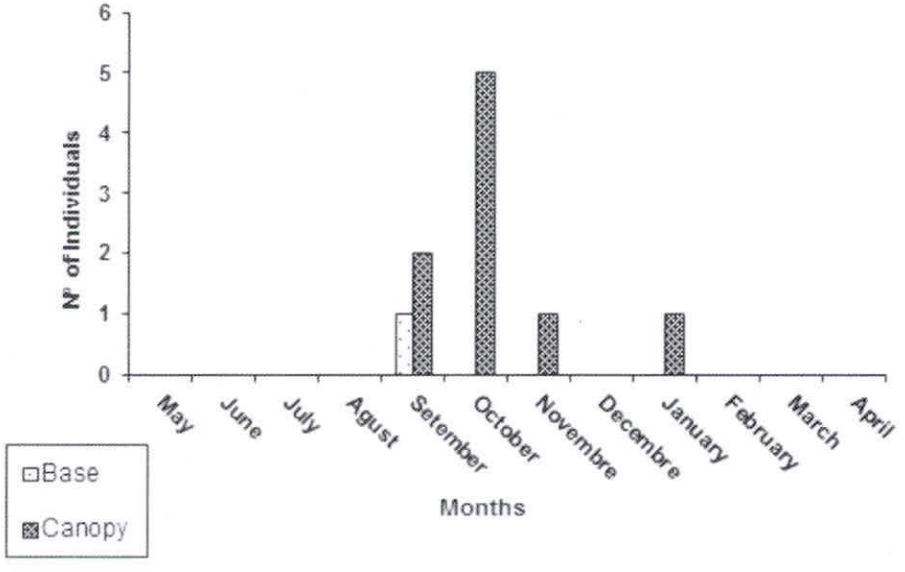

Figure 4. Number of individuals of *E. olivaceus* in the canopy and the base of the tree in an olivegrove in the Central Coast of Peru during May 2004 and April 2005.

DISCUSSION

We believe that *E. olivaceus* is a species that would also be feeding of the vegetable residuals taken place by the withered flowers and liberated pollen. To only have found one individual in the canopy, we think that *E. olivaceus* prefers to feed of organic rich matter in nutritious coming from the canopy of the tree.

We can conclude that these two species are associated with the olive tree because they are present and they only remain during states critical in the phenology of the cultivation when there is organic abundant matter as the rich pollen in vitamins, minerals and hydrates of carbon (Orzáez et al. 2004; Trivi de Mandri et al. 2006).

Contrary to the species of insects saprophytes associated with olive trees that are present in the plant during the whole year, but populations rise when the olive grove is their critical states phenological (Beingolea 1965; Beingolea 1969; Beingolea and Salazar, 1970; Aguilar et al. 1980; Canales and Valdivieso, 1999). The capture of *P. pulverulentus* and E. *olivaceus* started during the formation of the floral cluster and they remained during the states critical phenological as they were formation of the floral cluster, flowering, and formation and filled of fruit. We believe that these species could be feeding of the vegetable residuals taken place as were floral clusters, pollen, petals and vain fruits or not formed since in the olive tree 95 % of pollen is deposited at an inferior distance to 40 meters of their source and during the formation of fruits you ends up falling between the 96 and 99 % of the flowers, then the fruits continue their growth until the maturation without new falls take place, only produced for accidental and pathological causes (Rallo and Cuevas, 1999).

CONCLUSIONS

1. We have found to *P. pulverulentus* and *E. olivaceus*, associated with olive grape, both species have been registered for first time in olive grape in Peru.
2. We can conclude that these two species are associated with the olive tree, because they were present and they only remained during states critical in the phenological of the cultivation when there was organic abundant matter as the rich pollen.
3. The capture of *P. pulverulentus* and E. *olivaceus* begin during the formation of the floral cluster and they started during the states critical phenological as they were flowering, formation and filled of fruit.

ACKNOWLEDGMENTS

The authors thank for the support of the Agro industrial Company San Fernando S. A. owner of the olive grove. We sincere thanks go to Walter Diaz Burga, Director of Museum of Entomology of Servicio Nacional de Sanidad Agraria (SENASA) of Peru, for his help in the identification of species of Tenebrionidae.

REFERENCES

Acosta R. 1998. Procesos de animación en torno al olivar ecológico. In: I Jornadas de olivar ecológico. Tomo II. Cámara Oficial de Comercio de Industria de la Provincia de Jaén, 43-56. Jaén: Cámara Oficial de Comercio.

Adamopoulou, C., and A. Legakis. 2002. Diet of a lacertid lizard (*Podarcis milensis*) in an insular dune ecosystem. Israel Journal of Zoology, 48: 207-219.

Aguilar, P., J. Salazar, and E. Núñez. 1980. El cultivo del olivo. Rev. per. Ent., 23 (1): 100-102.

Alfaro, L., R. Barrera, and D. Velarde. 2000. Reporte Lachay - INRENA-Dirección General de Áreas Naturales Protegidas y Fauna Silvestre. Lima: INRENA.

Allsopp, P.G. 1980. The biology of false wireworms and their adults (soil-inhabiting Tenebrionidae) (Coleoptera): a review. Bulletin of Entomological Research 70: 343-379.

Arias, E. 2000. Coleópteros de Chile. Santiago de Chile: Fototeknika.

Arnal, E., and F. Ramos. 1990. Insectos relacionados con el cultivo de girasol. Maracay, Venezuela. FONAIAP Divulga 31: 31-35.

Beingolea, O. 1965. Notas sobre *Orthezia olivicola* (Beingolea). Rev. per. Ent. 8(1): 1-44.

Beingolea, O. 1969. Notas sobre la biología de *Saissetia oleae* Bern. (Hom.: Coccidae), Queresa negra del olivo, en laboratorio y campo. Rev. per. Ent. 12(1): 130-136.

Beingolea, O., and J. Salazar. 1970. Experiencias en el Control Integrado de las Plagas del Olivo. Rev. per. Ent. 13(1): 45–63.

Bejsak, R. 2006. Tenebrionidae and allied families. The preliminary checklist of Tenebrionidae. Australia: University of Sydney. http://134.60.85.50:591/Tenebrionidae/TenebrioN_su.html.

Brack, A., and C. Mendiola. 2000. Programa nacional de las naciones unidas para el desarrollo. Lima: Editorial: Bruño/PNUD.

Camacho, J., P. Güerere, and M. Quirós. 2002. Insectos y ácaros del guayabo (*Psidium guajaba* L.) en plantaciones comerciales del estado de Zulia, Venezuela. Rev. Fac. Agro. (LUZ) 19: 140-148.

Canales, A., and L. Valdivieso. 1999. Manual de control biológico para la conducción del cultivo del olivo. Lima: Ministerio de Agricultura.

Carpaneto, G.M., and S. Fattorini. 2001. Spatial and seasonal organisation of a darkling beetle (Coleoptera: Tenebrionidae) community inhabiting a Mediterranean coastal dune system. Italian Journal of Zoology 68: 207-214.

Carpaneto, G.M., and S. Fattorini. 2003. Seasonal occurrence and habitat distribution of tenebrionid beetles inhabiting a Mediterranean coastal dune (Circeo National Park, Italy). Revue d' Ecologie - La Terre et la Vie 58: 293-306.

Chen, X., M.B. Thompson, and C.R. Dickman. 2004. Energy density and its seasonal variation in desert beetles. Journal of Arid Environments 56: 559-567.

Cruz, L., J. Jiménez, A. Santiesteban, and A. Virgen. 2001. Response of *Epitragus sallaei* (Champion) (Coleoptera: Tenebrionidae) to the odour of *Mangifera indica* L. lowers. Southwestern Entomologist 26(2): 165-170.

Evenhuis, N.L., and L.G. Eldredge 2003. Bishop Museum, Occasional Papers. Records of the Hawaii Biological Survey. Part 2: Notes. p. 74, 78.

Fattorini, S. 2001. Temporal and spatial variations in darkling beetle predation by kestrels and other raptors in a Mediterranean urban area. Biología 56: 165-170.

Ferrú, M. A., and M. Elgueta. 2011. Lista de coleópteros (Insecta: Coleoptera) de las regiones de Arica y Parinacota y de Tarapacá, Chile. Boletín del Museo Nacional de Historia Natural 60: 9-61.

Giraldo, A. 2002. Análisis de los patrones de variación espacio-temporal de las poblaciones de coleópteros en la Reserva Nacional de Lachay durante el periodo 1998 - 2001. Thesis to opt Title of Biologist: UNALM.

Giraldo, A., and G. Arellano. 2003. Resiliencia de la comunidad Epígea de Coleoptera en las Lomas de Lachay después del evento El Niño 1997-98. Ecol. apl. 2(1): 59-68.

Giraldo, A., and G. Arellano. 2004. Respuesta de la comunidad de arañas epigeas (Araneae) en las Lomas de Lachay, Perú, ante la ocurrencia del evento El Niño 1997-98. Ecol. apl. 3(1): 45-48.

Guerin, J. 1953. Coleopteros do Brasil São Paulo, Brasil. São Paulo: Facultade de Filosofia, Ciências e Letras da Universidade de São Paulo.

Gutiérrez, C., T. Laguna, and M. Sarria. 2004. Manejo integrado de plagas. Guía MIP en el cultivo del tomate. 1ª ed. Managua: INTA.

Hilje, L., C. Araya, and F. Scorza. 1991. Plagas y enfermedades forestales en América Central: guía de campo. Serie Técnica, Manual Técnico N°4. Turrialba: CATIE.

Holdridge, L. 1960. Zonas de vida natural en el Perú. Memoria explicativa sobre el Mapa Ecológico del Perú. Lima: Instituto Interamericano de Ciencias Agrícolas de la OEA.

Krasnov, B., D. Ward, and G. Shenbrot. 1996. Body size and length variation in several species of darkling beetles (Coleoptera: Tenebrionidae) along a rainfall and altitudinal gradient in the Negev desert (Israel). Journal of Arid Environments 34: 477-489.

López, M., C. De Vicente, A. Fernández, and U. Fuente. 2000. Agrosistemas. Descriptiva de Ecosistemas, p. 27.

Marcano, J. 1976. Museo Nacional de Historia Natural y Universidad Autónoma de Santo Domingo, República Dominicana. Naturalista postal 26.

Marcuzzi, G. 1951. Tenebrionidae como indicatore del clima. Revista di Biologia di Perugia (Italy), 43: 399-437.

Mazzani, C., O. Luzón, and M. Chavarri. 2004. *Aspergillus flavus* asociado a *Epitragus* sp. (Coleoptera: Tenebrionidae) en maíz bajo riego en Turén, Estado de Portuguesa, Venezuela. Entomotropica 19(3): 157-159.

Morris, I. 1997. Interrelaciones entre olivos, plagas y depredadores. Tesis de doctorado: Universidad de Granada.

Morris, T., and M. Campos. 1999. Entomofauna depredadora del suelo del olivar. Estación Experimental del Zaidín. Zool. Baetica 10: 149-160.

Nielsen, V., P. Hurtado, D. Janzen, G. Tamayo, and A. Sittenfeld. 2004. Recolecta de artrópodos para prospección de la biodiversidad en el Área de Conservación Guanacaste, Costa *Rica.* Rev. biol. trop. 52(1): 119-132.

Orgeas, J., E. Vidal, and P. Ponel. 2003 Colonial seabirds change beetle assemblages on a Mediterranean island. Ecoscience 10: 38-44.

Orzáez, M., A. Díaz, R. Bravo, and G. Blázquez. 2004. The importance of bee-collected pollen in the diet: a study of its composition. International Journal of Food Sciences and Nutrition 53(3): 217-224.

Panhwar, F. 2005. The neem tree (*Azadirachta-Indica* A. Juss) a natural pesticide practice in Pakistan, p. 14.

Rallo, L., and J. Cuevas. 1999. Fructificación y Producción: 119 - 149. In: El cultivo del olivo. Eds. Barranco, D., Fernández-Escobar, D. and Rallo L. Córdova: Junta de Andalucía, Ed. Mundi-Prensa.

Raven, K. 1988. Orden Coleoptera IV. Lima: Universidad Nacional Agraria La Molina.

Sánchez, J. 2006. Requerimiento de suelos y aguas en la producción de cítricos en la costa central: problemas actuales y soluciones, p. 9.

Semida, F.M., M.S. Abdel-Dayem, S.M. Zalat, and F.S. Gilbert. 2001. Habitat heterogeneity and altitudinal gradients in relation to beetle diversity in South Sinai, Egypt. Egyptian Journal of Biology 3: 137-146.

Solervicens, J. 1995. Consideraciones generales sobre los insectos, el estado de su conocimiento y las colecciones. En: Simonetti, J., Arroyo, M.T.K., Spotorno, A.E. and Lozada, E. (Eds.), 198 - 210. Santiago de Chile: CONICYT.

Torres, J., and C. López Ocaña. 1981. Productividad primaria en las Lomas de la costa central del Perú. Separata del Boletín de Lima (14): 1-11.

Trivi de Mandri, M., L. Burri, and H. D'Antoni. 2006. Dispersión - depositación del polen actual en tierra del fuego. Universidad Nacional Autónoma de México. Revista Mexicana de Biodiversidad 77, 89-95.

Tschinkel, W. R. 1975. A comparative study of the chemical defensive system of tenebrionid beetles - II. Defensive behavior and ancillary structures. Ann. Entomol. Soc. America 68: 439-453.