https://doi.org/10.15446/cr.v9n2.97456

# BEDBUG *(CIMEX LECTULARIUS)* INFESTATIONS IN COLOMBIA. REPORT OF TWO CASES

**Keywords:** Bed bugs; Cimex; Parasites; Cimicidae; Case Reports.
**Palabras clave:** Chinches; Parásitos; Cimicidae; Informes de casos.

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**Received:** 23/07/2021 **Accepted:** 22/09/2021

## RESUMEN

**Introducción**. El *Cimex lectularius* (chinche de cama) es un parásito hematófago que representa una preocupación emergente y desatendida en Colombia. Debido a su creciente importancia en Salud Pública se presentan dos casos clínicos como consecuencia de una infestación por chinches.
**Presentación de los casos.** Hombre y mujer (de 31 y 30 años) que realizaron un viaje de luna de miel a Costa Rica y Nicaragua en el año 2017. A su regreso a Bogotá (Colombia) presentaron lesiones, sin explicación aparente, compuestas por pápulas eritematosas y pruriginosas de distribución agrupada con un patrón lineal. En consulta con Medicina del Viajero se hizo el diagnóstico de dermatitis por infestación de chinches de cama. Tras seguir las recomendaciones dadas por el personal médico (en las que no se sugirieron medidas químicas), los insectos y las lesiones desaparecieron.
**Conclusión.** Las chinches de cama son un problema de Salud Pública de creciente importancia a nivel mundial. Este reporte de dos casos presenta una de las pocas evidencias de su presencia en Colombia que se han publicado. Al ser un caso doméstico, muestra la importancia de un diagnóstico temprano y un abordaje holístico según las necesidades de los pacientes.



## ABSTRACT

**Introduction:** *Cimex lectularius* (bed bug) is a hematophagous parasite that can be considered as an emergent and neglected concern in Colombia. Due to their increasing importance, the following two clinical cases secondary to a bed bug infestation are presented.
**Case presentation:** Two patients, one male and one female (31 and 30 years old, respectively) went on their honeymoon trip to Costa Rica and Nicaragua in 2017. During those trips, both patients stayed in the same room in hotels of different categories. Upon their return to Bogotá (Colombia), erythematous lesions and pruritic papules appeared without any apparent explanation, which were associated with intense pruritus and had a clustered and linear (breakfast-lunch-dinner) pattern. During consultation with the Travel Medicine service, a diagnosis of dermatitis due to bed bug infestation was made. With the recommendations given by the medical staff (in which no chemical measures were suggested), the bugs and lesions disappeared.
**Conclusion:** Bed bugs are a public health problem of increasing importance worldwide. This report of two cases presents one of the few published evidences of their presence in Colombia. As both cases are domestic, the relevance of an early diagnosis and a comprehensive approach based on the needs of the patients is demonstrated.

## INTRODUCTION

Bed bugs are a hematophagous parasite that is emerging and neglected in public health. They pertain to the order *Hemiptera*, more specifically to the infraorder *Cimicomorpha*, which comprises 16 families with only three of them considered medically significant: *Reduviidae (Triatominae)*, *Polyctenidae*, and *Cimicidae*. Bed bugs belong to the latter, and more than 100 species have been described (1,2).

Bed bugs are of public health importance due to the psychological and economic impact associated with the burden of infestations (3). Since the last decade of the 20th century, the number of infestations and outbreaks has increased dramatically and synchronously worldwide (3). These infestations are caused by three species: *Cimex lectularius, Cimex hemipterus*, and *Leptocimex boueti* (1,4). The first two spread through human migration, colonization, and trade (1,3).

The most important clinical aspects of bed bugs are their bite, which can generate strong allergic reactions, as well as the psychological burden on patients. When biting, bed bugs inoculate various products and substances, including serpins, lysozymes, serine proteases, nitrophorins, among others (5,6), which can induce an allergic reaction in patients (1,5-7). Bites are usually painless, and the most common reaction is urticaria. The limbs, trunk and face are the most commonly affected areas (8). Sensitivity reactions can range from local and cutaneous to generalized systemic (8).

In Colombia, little is known about the distribution of bed bugs; however, there are historical reports from the middle of the 20th century detailing the presence and infestation of *C. hemipterus* and *C. lectularius* in warm regions such as Tobia (Cundinamarca), Villavicencio, and Restrepo (Meta) (9,10). There are also reports confirming its presence in the Andean region (11). There are a few specimens of *C. lectularius* in the collections of the Universidad Nacional de Colombia, Medellín Campus (collected from a house in the town of Támesis, Antioquia), as well as some other Colombian entomological museums. There are also multiple Colombian specimens that were captured in 1940 that are preserved in the Yale Peabody Museum (12), and some reports from the lost collection of the Instituto Nacional de Salud de Colombia, but other records are not easy to find. Due to the synchronous resurgence of this parasite worldwide and the relative lack of recent research in Colombia, it is important to improve surveillance of such infestations.

The following are two clinical cases of dermatosis resulting from a bed bug infestation detected in Colombia and possibly acquired outside the country.

## CASE PRESENTATION

A married couple consulted the Travel Medicine service of the Instituto Nacional de la Salud in Bogotá (Colombia) seeking advice on control and elimination measures for bed bug infestation. In December 2017, they took a honeymoon trip to Costa Rica and Nicaragua and when they returned to Bogotá in mid-January 2018, they noticed

the appearance of erythematous and pruritic papules on the man's hands and the woman's feet, with no apparent explanation. In the following six weeks, both reported new lesions on the face, neck, arms, hands, and lower limbs.

As the lesions persisted and no apparent cause was suspected, two months before their initial consultation they attended a secondary care center in the city of Bogotá on several occasions, where they were treated with antihistamines (loratadine 10mg orally every 24 hours for 5 days), topical corticosteroids (hydrocortisone 1% twice a day for 7 days) and ivermectin (5 tablets orally, single dose, 200mcg/kg), without achieving a notable improvement in their symptoms. During the infestation, one of the lesions on the man's face became superinfected, so he was treated with antibiotics (cephalexin 500 mg/oral every 6 hours for 7 days). The health professionals who treated them suggested that insect bites could be the cause of their problem.

When they did an internet search, they found that the cause of their symptoms could be a bed bug infestation, so they followed the recommendations they found: buying new bedding, searching for infestation nests (but found none), washing clothes with hot water, among others. However, these measures only worked temporarily, so they decided to visit the Travel Medicine service.

During that consultation, which took place on April 12, 2018, they were asked about their travel history in Colombia to endemic regions to rule out Chagas disease. They were also questioned about the presence of pets, personal hygiene routines, contact with foreign visitors, acquaintances or relatives who had traveled abroad, as well as presence of mosquitoes and/or fleas in the apartment, all of which they referred to as negative. The patients did not have insect samples for analysis, and it was not possible to visit their homes for inspection. In addition, the initial examination ruled out the possibility that the lesions were compatible with those produced by scabies.

The following is a description of the findings detected in each patient.

## Case 1

30-year-old woman with symptoms of insomnia, distress, skin lesions, and blemishes. She had a hypertensive and diabetic mother and reported no other relevant history. At the time of the consultation, she was under pharmacological treatment with loratadine (10 mg/day oral tablet) and hydrocortisone acetate cream at 1% topically twice a day. She lived with her husband in a building that had been built 5 years earlier, the residential area had access to all public services, and one person helped with the weekly cleaning of the apartment. She did not live with any domestic animals. No relatives or neighbors had similar symptoms. She mentioned two recent trips: one to Nicaragua from 4/12/2017 to 16/12/2017 and then to Costa Rica from 17/12/2017 to 5/01/2018. During those trips, she stayed in hotels rated as 2 or 3 stars. She did not check her rooms for insects or traces of blood on the bedding, and her luggage was left on the floor of the room at all times. Some hotels were in the middle of the jungle, where she had contact with animals. In some hotels, the rooms were damp, and the

last hotel had a carpeted floor. During her trip, she did not suffer lesions similar to the ones described. She only remembered getting mosquito bites during expeditions, but she stated that the itching sensation was different.

Physical examination showed blood pressure of 116/74 mmHg, heart rate of 72 bpm, respiratory rate of 20 rpm, and body temperature of 35.8 °C. Her limbs had good distal perfusion with no edema. Neurological examination showed no apparent motor or sensory deficits. Dermatologic examination showed erythematous papules with signs of scratching of 5 mm in diameter on the hands, arms and legs with a clustered and linear pattern. Postinflammatory hyperpigmentation was also observed in the same body areas.

## Case 2

31-year-old man with symptoms of insomnia, anxiety, general fatigue, lesions and skin spots, with a family history of high blood pressure on his father's side. During the course of the infestation, he received loratadine (10 mg/day tablet orally), hydrocortisone acetate cream 1% twice daily topically, and cephalexin (500 mg/oral every 6 hours). He was living with his wife and reported the same travel history and general information as her. On physical examination, he had the following signs: blood pressure: 120/78 mmHg; heart rate: 70 bpm; respiratory rate: 20 rpm; temperature: 35.6 °C. His limbs had good distal perfusion with no edema. Neurological examination showed no apparent motor or sensory deficits. Dermatologic examination showed erythematous papules of 7 mm in diameter, some with central blisters and signs of scratching located on the neck, hands, thorax, arms, and legs, with a clustered and linear pattern. His right thumb had a 10 mm blistering eruption that had been developing for 10 days. Postinflammatory hyperpigmentation was also observed in the same body areas mentioned above.

In the absence of the means to perform antigen laboratory tests, the Travel Medicine service decided to show the couple photographs of various insects, who identified *Cimex lectularius* as the cause of their symptomatology (Figure 1).


Figure 1. Adult specimen of *Cimex lectularius,* dorsal view.
Source: Personal file.

Due to the suggestive clinical appearance, the associated insect and the epidemiological history of travel, the diagnosis was bed bug dermatitis, so the following plan was devised for the treatment of the symptoms:

- Washing affected areas with soap and water.
- Local cold therapy on the affected areas for 10 minutes, repeated as necessary.
- Two paracetamol tablets (500 mg orally every 6 hours for 5 days).
- One tablet of desloratadine (5 mg per day orally for 10 days).
- Topical administration of betamethasone valerate cream 0.05% twice a day for 7 days on the affected areas.

They were also explained the epidemiological and clinical characteristics of bed bugs:

- They do not transmit diseases from person to person.
- They are not a sign of poor personal hygiene.
- Life cycle and feeding needs of blood-feeding bed bugs on humans.
- Hiding places: belongings and clothing (where they could infect other people).

The following indications were given as control measures:

1. Avoiding the use of insecticides or other chemical measures (patients requested).
2. Washing blankets, bedding and clothing with hot water and, if possible, with a hot drying cycle.
3. Using protectors for mattresses, pillows and other furniture such as sofas.
4. Filling cracks in the house.
5. Steam vacuuming the entire apartment, including the bed, especially cracks and crevices in furniture, walls, and floors.
6. Disposing of the filter and vacuum bags in a hermetically sealed plastic bag three times a week for three weeks, then continue with the usual cleaning routine.
7. Placing cardboard boxes on each leg of the bed and checking each morning for the presence of bugs.
8. Recommendations were given for future trips such as inspecting rooms and checking the location of luggage at the hotel and upon returning home.

A follow-up visit took place 12 months after the first consultation, and the following was found: during the first week after following the recommendations given, the patients found some insects in the boxes placed on the legs of the bed and the insomnia improved; in the second week, the couple had no more skin bites; after four weeks, the papules they had at the time of the consultation had healed spontaneously; and after four months, the multiple hyperpigmented lesions had completely cleared up. They found no evident nests or foci of infestation and no

neighbors reported symptoms of bed bug bites. No adverse reactions to treatment were reported. The chronology of the cases can be seen in Figure 2.

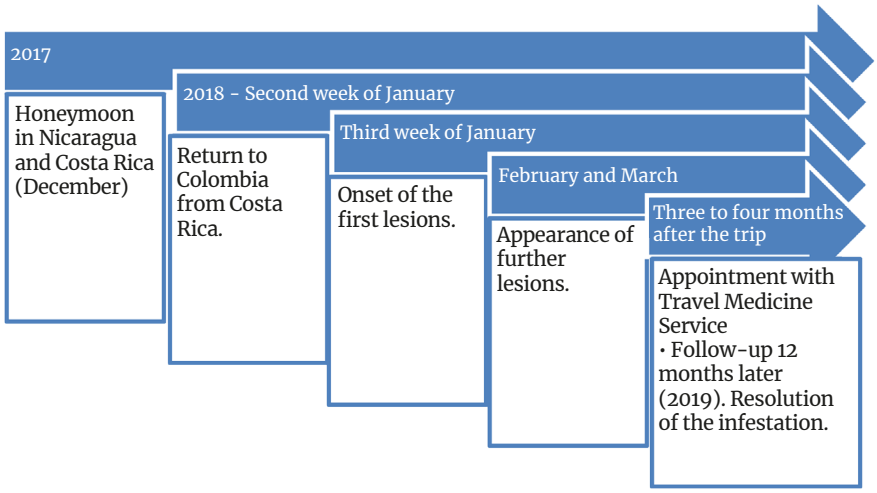


Figure 2. Timeline of cases.
Source: Own elaboration.

## DISCUSSION

According to available information, bed bugs are thought to have emerged in Middle Eastern caves millions of years before the appearance of bats (1,3,8,13-14). Furthermore, millions of years later, the discomforts provoked by these insects were reported in Egyptian, Roman, Jewish and Christian writings (3,15), in which sleep pattern alterations, psychological alterations and allergic reactions (urticaria) were documented (3). All these symptoms were also observed in the clinical cases described here, whose manifestations are similar to those reported in the literature and in books on medical entomology (8,16-17). Bed bugs spread from these regions (1,3) and have significantly affected several places in the world, including Colombia, where two species of bed bugs have been reported: *Cimex hemipterus and Cimex lectularius* (9,10).

The incidence of this parasite decreased in developed countries thanks to the development of insecticides and improved control measures. This also appears to have been the case in Latin America, especially due to the control of other arthropods of public health importance. In this case report, the first signs of resurgence were isolated cases, implying that there is a lack of continuous surveillance for the control of this type of insect (18-20). This re-emergence has been explained by multiple theories, including globalization and the ease of cross-border travel (3), as in the case presented. Additionally, changes in pest management policies, decreased prevention in hotels that do not receive routine pest control treatments, reduced efficacy of insecticides, and limited knowledge in the management of

modern strains lead to control failures and increased infestations in areas with high population density (3).

The new strains of bed bugs are very different from those that existed a few decades ago. It is now known that these parasites have multiple defense mechanisms against insecticides: not only do they have a thicker exoskeleton, but they also produce enzymes that degrade the substances that make up insecticides. In addition, some of them show mutations that prevent the action of the components of these chemical mechanisms (21); however, this does not explain their synchronous resurgence. One possible theory is that the emergence of these resistant strains may have had a common origin in a region where they coexist, such as Africa or India; another possibility is that, as with malaria, resistance has emerged independently in different regions of the globe (21), although these explanations fall short.

This report has similarities with earlier reports of the resurgence of bed bugs in Europe, Costa Rica and other parts of the world (18,19,21). In 1999, four different specimens (from four different bed bug infestations) were brought to the Brighton Public Health Laboratory, and all clinical cases had a history with circumstantial evidence to suggest transfer of bed bugs through luggage or furniture (15,19). In this case, according to the trace-back by the Travel Medicine service in the background search, the bed bugs were probably brought from abroad, probably from Costa Rica, because they were reported for the first time in 30 years in that country in the year the couple traveled there (22). Bed bugs have also been reported in Nicaragua, but little information is available.

The history, distribution and epidemiology of bed bugs in Colombia are unknown. In the absence of surveillance and reliable historical records, there is no certainty about the origin of this parasite in the country; however, there is a possibility of bed bug infestations of local origin (23), but the prevalence and incidence are unknown.

To treat bed bug infestation, surveillance, prevention and environmental sanitation are fundamental. This type of public health problems should have a multiple approach (3), as in the case presented. Both chemical and non-chemical inspection, sanitation and cleaning options need to be addressed: these measures include visual inspection (the use of dogs can be useful), surveillance with bed-leg or *CO2* traps, vacuuming, vaporization and isolation of infested material (destruction of infested clothing and furniture), and insecticide controls. Methods such as thermal devices and carbon dioxide fumigation can also be used. Biological control measures, which in the case of bed bugs include the use of *Reduvius personatus* (a hunting hemiptera), ants, pseudoscorpions and spiders (8), are feasible but difficult to use and very ineffective.

The growing presence of bed bugs calls for a pressing need for increased research and coordination of all sectors involved in their control. This involves the integrated pest management industries, the medical and veterinary sectors,

public health institutions, and universities, in order to prevent the occurrence of other emerging or re-emerging conditions.

Limitations of this case report include the lack of entomological and genomic identification of the insects, the impossibility of antigen testing, and the absence of records such as photographs or specimens. The existence of these records could have ruled out with greater certainty parasites such as fleas, mites, or mosquitoes. In any case, the diagnosis could be confirmed thanks to the background, the medical history and the identification of the parasite by the patients through photographs from the institution's archives. Other ectoparasites such as *Pediculus humanus corporis* and *Sarcoptes scabiei*, as well as others from the *Triatominae* or *Reduviidae* families, were ruled out because they are unlikely due to socio-demographic aspects and, epidemiologically, there is no temporal correlation with respect to the appearance of symptoms and signs. However, the rapid identification of the parasites with the help of the patients, their medical history and physical examination contributed to the success of the treatment, which was implemented without the use of chemical measures.

## CONCLUSION

This case shows the growing importance of bed bug infestations, not only in traveler's medicine, but in the possibility of domestic cases. In this sense, the re-emergence of bed bugs may have a multifactorial origin: travel, increasing resistance to insecticides, changes in global public health policies, and the lack of stronger and more articulated surveillance. These aspects must be improved to avoid the increase and spread of infestations. Control and treatment options should and can be multiple, although this case is a clear example that if infestations are quickly and decisively addressed, the use of chemicals can be avoided.

## ETHICAL CONSIDERATIONS

Written consent was received for the publication of this case.

## CONFLICTS OF INTEREST

None stated by the authors.

## FUNDING

None stated by the authors.

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