

# Caribbean Yellow Band Disease

## Enfermedad de Banda Amarilla del Caribe

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Caribbean Yellow band disease (CYBD) is a bacterial disease affecting up to 12 coral species in nearly every region of the Caribbean. It has been recorded in Puerto Rican waters since 1996 and has resulted in extensive coral tissue loss, especially of key reef building *Orbicella* species, or star corals.<sup>1-4</sup> The disease is characterized by yellow blotches (1-5cm), often multifocal, that turn into rings as coral tissue starts to die in the center.<sup>5,6</sup> While the putative pathogen has not been confirmed, several bacterial strains of the genus *Vibrio* have been identified in association with CYBD.<sup>5,7,8</sup> Evidence suggests that the pathogens of CYBD target the zooxanthellae, the symbiotic algae that lives within the coral polyp<sup>7-10</sup> and that CYBD is not contagious or transmissible by direct contact or water.<sup>11</sup> CYBD leads to multiple adverse effects in corals, including reduced fecundity, impaired metabolic and defense processes, loss of tissue, expulsion of the symbiotic algae, and coral death.<sup>7,12,13</sup> Rates of tissue loss due to CYBD are variable, with various datasets showing rates ranging from 5 to 36 cm/year.<sup>3,7,14,15</sup> Water temperature, reef depth, season and coral species have all been found to affect the disease prevalence and virulence.<sup>9,14,16,17</sup> For example, in Puerto Rico, long-term monitoring at La Parguera and Mona Island showed dramatic increases in CYBD prevalence and virulence following a warm water anomaly and coral bleaching event in 2005.<sup>18,19</sup> Findings of the spatial distribution of CYBD have varied across locations, from spread-out in Mexico<sup>16</sup> to clustered in Puerto Rico.<sup>17</sup> Chiseling a firebreak between CYBD lesions and the remaining healthy coral may be an effective mitigation strategy.<sup>20</sup> Researchers have also had success halting disease progression by aspirating and then placing clay or epoxy putty over the band.<sup>21</sup>

La enfermedad de la banda amarilla del Caribe (CYBD, por sus siglas en inglés) es una enfermedad bacteriana que afecta 12 especies de corales en casi todas las regiones del Caribe. Se identificó en aguas puertorriqueñas desde el 1996 y ha causado una gran pérdida de tejido de coral, especialmente en las especies del género *Orbicella* (corales estrellas), que ayudan a formar la estructura de los arrecifes.<sup>1-4</sup> La enfermedad se caracteriza por manchas amarillas (1-5 cm), a menudo multifocales, que se convierten en anillos cuando el tejido coralino comienza a morir en el centro.<sup>5,6</sup> El patógeno putativo no está confirmado, pero los estudios identificaron varias cepas bacterianas del género *Vibrio* en asociación con CYBD.<sup>5,7,8</sup> La evidencia sugiere que los patógenos de CYBD apuntan a las zooxantelas, que son las algas simbióticas que viven dentro del pólipo de coral,<sup>7-10</sup> y que CYBD no es contagioso ni transmisible por contacto directo o agua.<sup>11</sup> CYBD causa múltiples efectos adversos en los corales, incluyendo una reducción en la fecundidad, procesos metabólicos y de defensa deteriorados, pérdida de tejido, expulsión de las algas simbióticas y eventualmente la muerte.<sup>7,12,13</sup> Las tasas de pérdida de tejido debido a CYBD son variables, con varios conjuntos de datos muestran tasas entre 5 y 36 cm / año.<sup>3,7,14,15</sup> La temperatura del agua, la profundidad del arrecife, la estación del año y las especies de coral pueden afectar la prevalencia y virulencia de esta enfermedad.<sup>9,14,16,17</sup> Por ejemplo, en Puerto Rico, el monitoreo a largo plazo en La Parguera y la isla Mona mostró aumentos dramáticos en la prevalencia y virulencia de CYBD luego de una anomalía en aguas

cálidas y un evento de blanqueamiento de corales en 2005.<sup>18,19</sup> Los hallazgos de la distribución espacial de CYBD han variado entre ubicaciones, desde dispersarse en México<sup>16</sup> hasta agrupadas en Puerto Rico.<sup>17</sup> Cincelar un cortafuego entre las lesiones de CYBD y el coral sano puede ser una estrategia eficaz para evitar que la lesión progrese al resto del coral.<sup>20</sup> Los investigadores han tenido éxito en detener la progresión de la enfermedad aspirando y luego poniendo la arcilla o la masilla epoxi sobre la banda.<sup>21</sup>

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