Environment Are Tropical Forests Losing Their Insects?

 A tropical forest night should feel busy. Insects should rise from the leaf litter and cluster around flowers. They pollinate trees, recycle nutrients, and feed birds and bats. Scientists are asking whether that abundance is weakening across the tropics. The question is hard to answer because the tropics are undermeasured. Tropical forests cover a small part of Earth’s surface, yet they hold a substantial share of described species and most insect species. Long-term monitoring is limited, and global biodiversity datasets have historically been biased toward Europe and North America. Even basic cataloguing is incomplete. The review estimates that 85-95% of tropical forest insect species remain undescribed. What monitoring exists is uneven. Publicly accessible insect time series are concentrated in the Americas, with many from a single long-studied site in Panama and many focused on butterflies and moths. Large regions still lack baseline data. That does not mean other insects are stable. It means many trends cannot yet be tested. With limited time series, researchers often compare habitats across space. An intact forest is compared with a logged forest, fragments, farms, and plantations. Analyses using the PREDICTS database suggest tropical insect assemblages are especially sensitive to historical warming and agricultural intensification, and that agricultural expansion is almost universally negative. This matters because roughly half of tropical forest habitat has already been converted to agriculture. Land-use change is the most blunt driver. The review estimates that about 50% of all tropical forests have been removed and replaced by agriculture, with severe impacts on insect diversity and function. In Malaysia, oil palm plantations contained only about half the insect species found in nearby primary and logged forests. Inside remaining forests, selective logging can shift communities, often reducing large predators while favoring herbivores and small-bodied generalists. Climate change adds pressure through both warming and extremes. The review highlights that wet and dry extremes can drive declines, and that significant disruptions have followed El Niño-linked drought events in some tropical insect populations. It also warns that El Niño Southern Oscillation cycles are becoming increasingly unpredictable with climate change, which could destabilize rainfall patterns across many tropical regions. In practice, hotter baselines mean drought and heat spikes can push insects past thermal limits. Chemicals add another strain. The review reports that more than half of the 2018 production of some pesticides banned in the European Union went to developing countries in the tropics, which account for roughly a quarter of global pesticide use. The synthesis links agrochemicals to reduced insect diversity and abundance, especially in sensitive species and early life stages. Urban growth compounds those pressures. By 2018, more than 1.5 billion people lived in urban areas in the tropics, and urban land cover is projected to expand further by 2030. Artificial light at night can draw and disrupt insects; in Amazonia, reducing blue wavelengths cuts insect attraction by almost 60%. Drift and runoff can move chemicals beyond fields and into forest edges, streams, and villages. On islands, invasive species can quickly tip systems. Invasive species account for the overwhelming majority of global extinctions on islands, and invasive ants such as the big-headed ant have been linked to reduced native diversity across multiple insect orders. Why does this matter beyond conservation? Because insects are infrastructure. The review lists core functions at risk, including pollination, decomposition, and dung and carrion removal, with knock-on effects for insect-eating birds and bats. It also outlines a public health pathway. If predators and parasitoids decline more than herbivores, pests and disease vectors can rise, raising risks for farms and settlements. Vector-borne pathogens already cause more than 700,000 human deaths each year, concentrated in tropical regions. The review emphasizes that trends inside intact forests are mixed. Some protected sites show declines, others look stable, and some groups increase. Patchy evidence is not reassurance when the monitoring net is thin and long runs of data are rare. <p style="margin-top:6.0pt;margin-

right:0cm;margin-bottom:6.0pt;margin-left: 0cm;text-align:justify">The practical response is clear. Protect remaining primary forests and extend protection to adjacent degraded forests that still hold diversity and buffer intact cores. Build standardized monitoring now and keep it open and comparable across sites. Metabarcoding and environmental DNA can speed identification, though reference libraries and standards still need work. Tropical forests can still look intact from above. The risk is that the smallest workers change first, and that the consequences will surface later and be far away.   Source: Causes and consequences of insect decline in tropical forests. Nature Reviews Biodiversity <style>@font-face {font-family:"Cambria Math"; panose-1:2 4 5 3 5 4 6 3 2 4; mso-font-charset:0; mso-generic-font-family:roman; mso-font-pitch:variable; mso-font-signature:-536870145 1107305727 0 0 415 0;}@font-face {font-family:Calibri; panose-1:2 15 5 2 2 2 4 3 2 4; mso-font-charset:0; mso-generic-font-family:swiss; mso-font-pitch:variable; mso-font-signature:-469750017 -1040178053 9 0 511 0;}p.MsoNormal, li.MsoNormal, div.MsoNormal {mso-style-unhide:no; mso-style-qformat:yes; mso-style-parent:""; margin:0cm; mso-pagination:widow-orphan; font-size:12.0pt; font-family:"Calibri",sans-serif; mso-ascii-font-family:Calibri; mso-ascii-theme-font:minor-latin; mso-fareast-font-family:Calibri; mso-fareast-theme-font:minor-latin; mso-hansi-font-family:Calibri; mso-hansi-theme-font:minor-latin; mso-bidi-font-family:"Times New Roman"; mso-bidi-theme-font:minor-bidi; mso-font-kerning:1.0pt; mso-ligatures:standardcontextual; mso-fareast-language:EN-US;}p {mso-style-priority:99; mso-margin-top-alt:auto; margin-right:0cm; mso-margin-bottom-alt:auto; margin-left:0cm; mso-pagination:widow-orphan; font-size:12.0pt; font-family:"Times New Roman",serif; mso-fareast-font-family:"Times New Roman";}.MsoChpDefault {mso-style-type:export-only; mso-default-props:yes; font-family:"Calibri",sans-serif; mso-ascii-font-family:Calibri; mso-ascii-theme-font:minor-latin; mso-fareast-font-family:Calibri; mso-fareast-theme-font:minor-latin; mso-hansi-font-family:Calibri; mso-hansi-theme-font:minor-latin; mso-bidi-font-family:"Times New Roman"; mso-bidi-theme-font:minor-bidi; mso-fareast-language:EN-US;}div.WordSection1 {page:WordSection1;}</style>
