

and processing conditions. At the same time, its strong sprouting capacity also helps increase the supply of fresh leaves in early spring. However, in terms of flavor expression for high-end Longjing tea, some studies have shown that Wuniuzao is slightly inferior to traditional population varieties or Longjing 43 in aroma layering and taste body, especially when developing products with a high-end traditional style, where a trade-off often needs to be made between “earlier market entry” and “depth of quality.”



Figure 3 Morphological characteristics of Longjing 43 under different conditions

In addition to Wuniuzao, cultivars in the Zhenong series (such as Zhenong 117) have also become important clonal materials gradually promoted in some Longjing-producing areas in recent years. These cultivars usually possess strong adaptability, high yield potential, and good bud uniformity, and they show relatively stable growth vigor and processing suitability under multiple ecological conditions. In non-traditional Longjing-producing regions such as western Sichuan, materials such as Wuniuzao, Changye Longjing, and Zhenong 117 have all performed well in bud-leaf traits, biochemical composition, and suitability for premium green tea processing. Among them, Wuniuzao and Changye Longjing have relatively high total catechin and amino acid contents and moderate tea polyphenol levels, giving them better overall quality, while Zhenong 117 maintains similar quality but yields more than local control cultivars, making it suitable for medium-scale promotion. These results indicate that, under proper cultivation and processing conditions, promoted cultivars can reproduce the key quality characteristics of the Longjing style to a certain extent.

From the perspective of aroma metabolite profiles, there are obvious differences among promoted cultivars. Comparative studies have found that after being processed into Longjing tea, Wuniuzao differs from Longjing 43 and population varieties in the relative contents of esters, aldehydes, heterocyclic compounds, alcohols, and acids, suggesting some specificity in its aroma expression pathway. However, core aroma compounds such as linalool, D-limonene, β -ionone, jasmone, and (Z)-hexenyl esters still dominate across different materials, indicating that the basic aroma framework of Longjing tea can still be maintained (Ao et al., 2025). In general, teas made from Longjing 43 and population varieties tend to have relatively higher ester and aldehyde contents, whereas some introduced materials may accumulate more heterocyclic compounds or organic acids, thereby altering the balance among chestnut-like, fresh, and sweet aromas to some extent (Ao et al., 2025). In terms of non-volatile components, these promoted cultivars usually combine relatively high amino acid contents with moderate catechin levels, which is favorable for forming a good freshness foundation while maintaining a balance between