Increasing fruit consumption is important for maintaining and improving the health of human populations as well as having a positive effect on the economic sustainability of industries. For the past decade our research has focussed on ways to integrate sensory and consumer approaches into research on the biology of perennial fruit crops. The aim has been to link understanding of consumer preference and choice of fruit directly into research programmes focussing on the genetic and environmental factors that influence fruit quality. There are generally four reasons for undertaking these studies: (1) the need to develop quality control instruments, (2) the desire to predict consumer responses to novel fruit and/or higher quality offerings of existing fruit, (3) the desire to understand what is being perceived in human sensory assessments of fruit, and (4) the need to fundamentally understand the biological processes that determine eating quality of fruit. In this presentation, we will show that biological processes associated with the transport and accumulation of carbohydrate from the tree or vine into fruit have a fundamental role in determining consumer acceptability of kiwifruit, stonefruit, avocados and apples. For apples, we will provide evidence for a new index that can be used to predict overall consumer acceptability of fruit harvested from an orchard. We propose that that the ability to directly link physiological processes that occur within fruit to consumer preferences may provide a more direct way to understand and establish targets for improved eating quality via manipulation of tree or vine management practices as well as manipulation of genetic and environmental factors. These targets need to be integrated into a broader knowledge of non-sensory as well as sensory factors that determine how well fruit meets the needs of consumers’ lifestyles.