

subpopulation with the original population follows the principles we will develop in this chapter for mixed populations.

## 16.2. MAJOR CLASSES OF INTERACTIONS IN MIXED CULTURES

The major interactions between two organisms in a mixed culture are competition, neutralism, mutualism, commensalism, amensalism, and prey–predator interactions. Table 16.1 summarizes these interactions.

**TABLE 16.1** Scheme of Classification of Binary Population Interactions. The Roles of *A* and *B* May Be Reversed. Top, Indirect Interactions; Bottom, Direct Interactions

Effect of presence of <i>B</i> on growth rate of <i>A</i>	Effect of presence of <i>A</i> on growth rate of <i>B</i>	Qualifying remarks	Name of interaction
<i>Indirect Interactions</i>			
—	—	Negative effects caused by removal of resources	Competition
—	O	Negative effects caused by production of toxins or inhibitors	Antagonism
—	O	Negative effects caused by production of lytic agents; positive effects caused by solubilization of biomass	Amensalism
—	+		Eccrinolysis
+	O	Positive effects caused by production by <i>B</i> (host) of a stimulus for growth of <i>A</i> (commensal) or by removal by <i>B</i> of an inhibitor for growth of <i>A</i>	Commensalism
+	+	See remarks for commensalism. Also, presence of both populations is not necessary for growth of both	Protocooperation
+	+	See remarks for commensalism. Also, presence of both populations is necessary for growth of either	Mutualism
—	+	<i>B</i> feeds on <i>A</i>	Feeding (includes predation and suspension feeding)
<i>Direct Interactions</i>			
—	+	The parasite ( <i>B</i> ) penetrates the body of its host ( <i>A</i> ) and converts the host's biomaterial or activities into its own	Parasitism
+	+	<i>A</i> and <i>B</i> are in physical contact; interaction highly specific	Symbiosis
—	(or perhaps O)	Competition for space	Crowding

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