The 10 Most prevalent filamentous bacteria

1. *Nocardia* spp.
   Gram positive, Neisser negative, irregularly-bent, short filaments mostly within the floc but frequently in foam trapped in the aeration basin or clarifier. True branching is often observed and there is no sheath and no attached growth present. *Nocardia* is the main cause of "dirty brown" foam at activated sludge treatment plant. Indicative of excessive FOG (fats, oils, greases) in the wastewater.

2. Type 1701
   Gram negative, Neisser negative, relatively short curved or bent filaments composed of sausage-shaped cells contained in a tight fitting sheath. Filaments are found mostly in the floc with few, short filaments extending into the bulk solution. Significant amount of attached growth are usually observed.

3. Type 021N
   Gram negative, Neisser negative (with some Neisser positive granules), straight, smoothly curved or sometimes coiled filaments composed of ovoid, rectangular and/or barrel-shaped cells always with a well defined septa with no attached growth.

4. Type 0041
   Gram positive or gram variable, Neisser negative (with infrequent Neisser positive granules), straight or smoothly curved filaments composed of square-shaped cells contained in a clear, tightly fitting sheath. Observed within the floc and covered with heavy attached growth.

5. *Thiothrix* spp.
   Gram negative, Neisser negative (with some Neisser positive granules), straight or smoothly curved filaments with rectangular cells having clear septa without indentations and without attached growth.

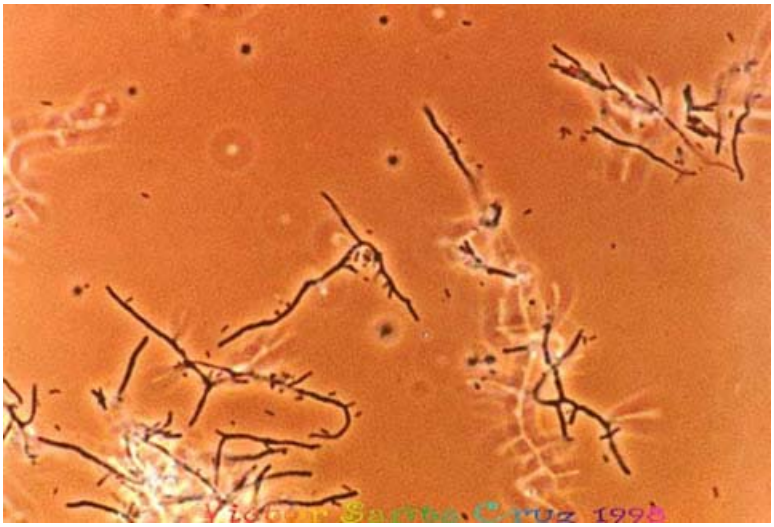
6. *Sphaerotilus natans*
   Gram-negative, Neisser negative, relatively long straight, smoothly curved filaments composed of round-ended, rod-shaped cells contained in a clear, tightly fitting sheath. False branching is frequently observed.

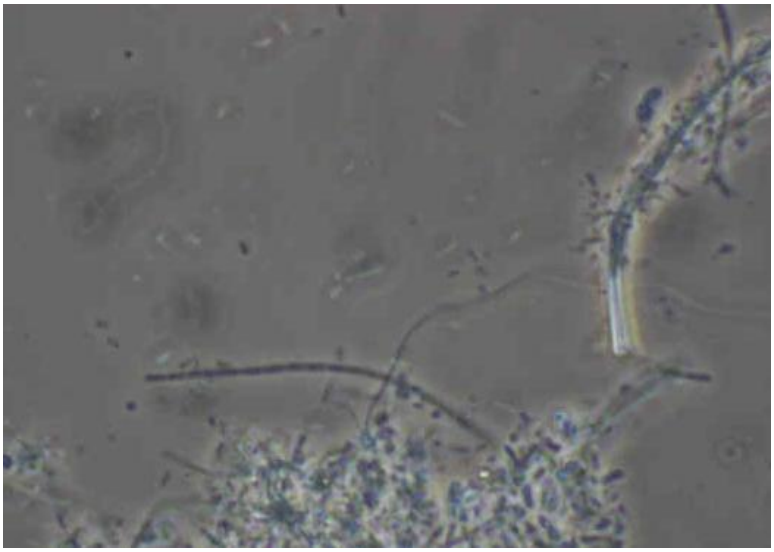
7. *Microthrix parvicella*
   Gram positive, Neisser negative, irregularly coiled filaments within the floc or in loose "patches" free in the bulk solution. Neither a sheath nor attached growth are present.

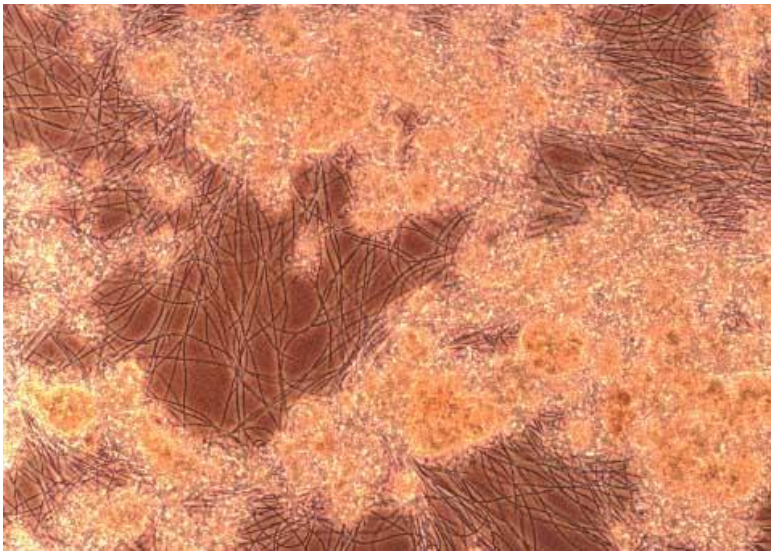
8. type 0092
   Gram-negative, Neisser positive, straight, irregularly curved or bent filaments composed of rectangular cells without constrictions at the septa. Neither attached growth nor a sheath are present.

9. *Haliscomenobacter hydrossis*
   Gram-negative, Neisser negative, straight or bent thin filaments found radiating from the floc. A sheath is present and there may be attached growth. Very small: may be overlooked when examining at 100X.

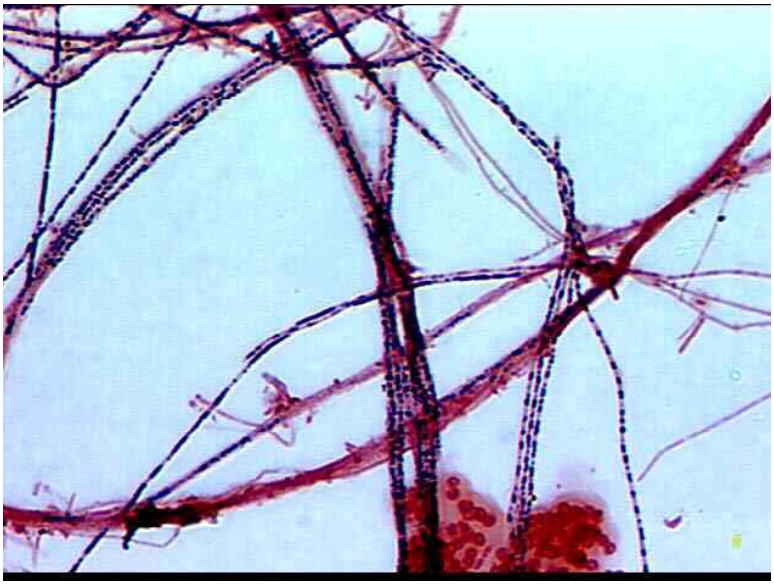
10. Type 0675
    Gram positive or gram variable, Neisser negative (with some Neisser positive granules), straight or smoothly curved filaments similar to type 0041 but smaller in trichome length. Usually heavy attached growth when observed inside the floc structure and sometimes no attached growth when extending into the bulk solution


Photomicrograph of *Nocardia* showing short gram-positive filaments with true branching.


Photomicrograph of Type 1701 at 1000x (Phase contrast live sample).


Photomicrograph of type 021N 100x (Phase contrast live sample)

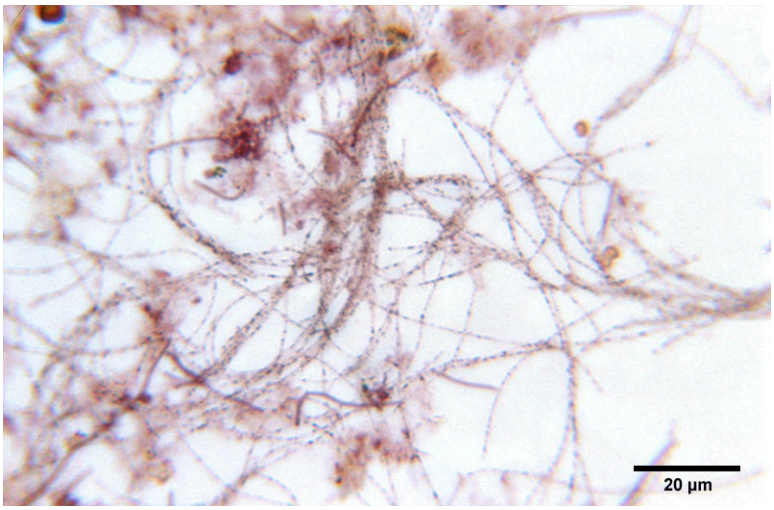
Photomicrograph of type 0041. Notice attached growth typical of type 0041.



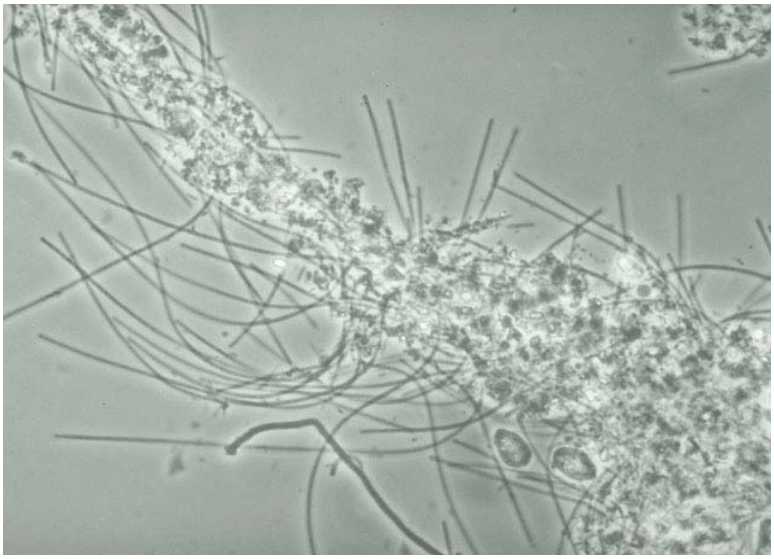
Photomicrograph of *Thiothrix*

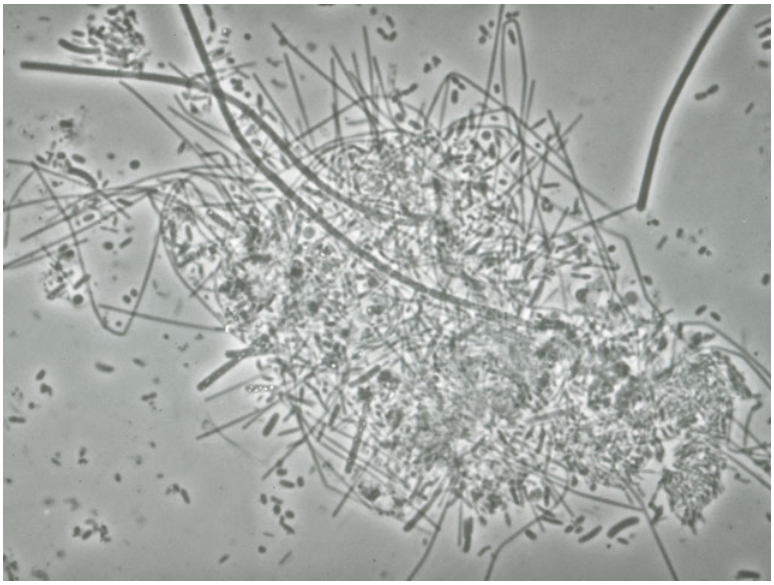
11.

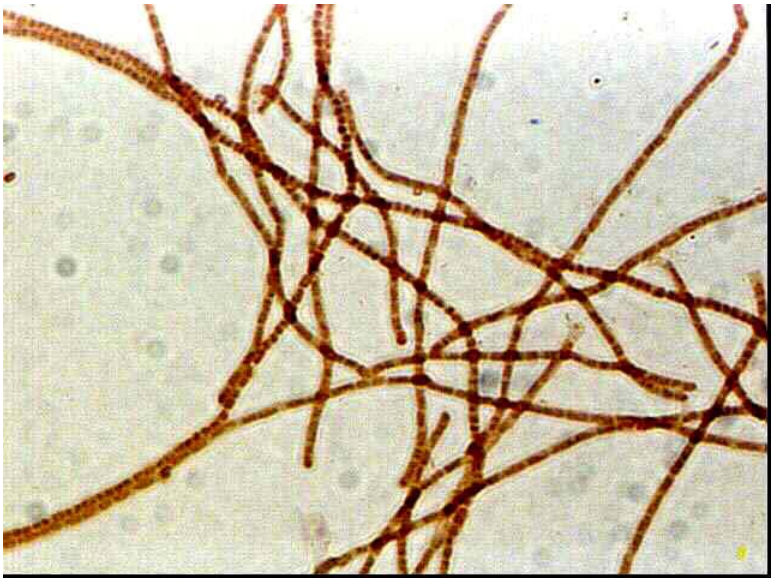
Photomicrograph of *Sphaerotilus natans*. Notice the false branching



Photomicrograph of *Microthrix parvicella.* *M. parvicella* typically stains gram positive.


Photomicrograph of type 0092.


Photomicrograph of *Haliscomenobacter hydrossis*



Photomicrograph of Type 0675