Asteraceae or Compositae (Aster Family)

The following is an excerpt from the "Vascular Flora of the Southeastern United States, Volume 1, Asteraceae," by Arthur Cronquist

"Annual, biennial, or perennial herbs, or less commonly shrubs, only some extra-limital spp. becoming trees. Flowers sessile in a compact head on a common receptacle, sometimes individually subtended by a small bract, and nearly always (including all our spp.) collectively surrounded by an involucre of few to many bracts. The flowers are epigynous (with stamens, petals, and sepals attached to the top of the ovary, the ovary inferior to the other floral parts), perfect or unisexual (or some of them neutral), sympetalous (with petals united, at least near the base), regular or irregular, commonly 5-merous; calyx represented by a pappus of scales, awns, short setae (a bristle), long, capillary or plumose bristles, or a hyaline (see description below) to chartaceous (with a papery texture, usually not green) or coriaceous (leathery) crown or ring, or by some combination of these, or seldom wholly wanting; stamens as many as the corolla lobes and alternate with them; filaments attached well down in the corolla tube; anthers elongate, connate into a tube, rarely merely connivent; ovary inferior, of 2 carpels, unilocular, with a single ovule; style 2-cleft (often undivided in functionally staminate flowers), the stigmatic surfaces variously restricted, so that each branch often has a sterile (nonstigmatic) appendage. Fruit an achene, crowned by the persistent (less often deciduous) pappus."

"The Asteraceae are one of the two largest families of flowering plants, with certainly more than 15,000 species. The only other family of comparable size is the Orchidaceae. The Asteraceae are cosmopolitan in distribution, but partial to open or semiopen habitats rather than deep woods. In most parts of the temperate zone, including our region, they are by far the largest family. Many genera and spp. are cultivated for ornament. The family is one of the easiest to recognize, but many of the genera are poorly defined or confluent."

"The flower heads vary from small to large, and are often brilliantly colored. The number of flowers in a head is seldom less than 5, and ranges upward into the hundreds or even more than a thousand, as in the common cultivated sunflower. A few species have only a single flower in each head. *Echinops* and some other genera have one-flowered, individually involucrate heads aggregated into a secondary head with a secondary involucre. Compound heads with more than one flower in each individual head also occur in some genera, such as *Elephantopus*."

"The *involucral bracts* are usually herbaceous (not woody, i.e. green), or subherbaceous in texture, varying to scarious (thin, dry, and membranous in texture, not green), hyaline (thin, membranous and translucent or transparent), coriaceous (with a leathery texture), or cartilaginous (tough and firm but elastic and flexible, like cartilage). They may be few and in a single row, or numerous and imbricate (overlapping), or modified into spines, or even (as in *Xanthium*) concrescent (to grow together – coalescence) into a spiny bur (cocklebur)."

"The *receptacle* may be *chaffy*, with a bract behind each flower (as in many Heliantheae), or may be covered with long, stout bristles (as in most Cynareae), or may be *naked*, without chaff or bristles. When naked it may sometimes be minutely pitted, with slender, chaffy partitions separating the pits, and is then said to be *alveolate*. It may even be softly hairy, as in some spp. of *Artemisia*."

"The flowers are of several general types. In one type they are perfect (or functionally staminate) and the corolla is tubular or trumpet-shaped or goblet-shaped, with typically 5 short terminal lobes or teeth. This type of flower is called *a disk flower*. A head composed wholly of disk flowers is said to be *discoid*."

"In another type the flower is pistillate or neutral (without a style), and the corolla is tubular only at the very base, above which it is flat and usually bent backward so as to spread away from the center of the head. The flattened part of a corolla of this type is called a *ray* or *ligule*, and the flower bearing it is called a *ray flower* or *ligulate flower*. Often the ligule exhibits traces of two or three corolla lobes as small terminal teeth. Except for the pistillate heads of a few dioecious groups, the head is never composed solely of flowers of this type. Instead, the pistillate or neutral ray flowers are found at the margin of the head, the center being occupied by disk flowers. Such a head, with both ray flowers and disk flowers, is said to be *radiate*."

In some spp. the ray or ligule of the marginal, pistillate flowers does not develop, so that the corolla is tubular. In addition to not bearing stamens, a corolla of this type differs from the corolla of an ordinary disk flower in the absence of the regular terminal teeth, and often also in being more slender. A head in which the

pistillate flowers lack rays is said to be *disciform*, although the term discoid is sometimes loosely extended to cover this type."

"Another type of flower superficially resembles the ray flower of a radiate head, but differs in being perfect and in usually having 5 terminal teeth on the ligule. The heads of the tribe Lactuceae consist wholly of flowers of this type and are called *ligulate heads*. Ligulate perfect flowers are rare in other tribes, and almost never make up the whole head. Among our genera, *Stokesia*, in the Vernonieae, has the marginal flowers perfect and ligulate."

"Still another type of flower, found only in the Mutisieae, has a bilabiate corolla, with the outer lip generally the larger. These bilabiate flowers are generally perfect, and differ from ordinary disk flowers only in the shape of the corolla."

"In some spp. of *Centaurea* the marginal flowers are neutral and have an enlarged, irregular, raylike corolla."

In conjunction with my handout "Composite Bract Pictures," I have included below some brief descriptions of some of the most common darn yellow composites involucral bracts, and keys using the involucral bracts. This should allow you to use this character in the field to easily separate *Helianthus, Silphium, Coreopsis, Rudbeckia, Polymnia* (*Smallanthus*), *Helenium* and *Solidago*.

Helianthus (Sunflower) - involucral bracts subequal or evidently imbricate, generally green and more or less herbaceous, at least distally (toward the tip).

Silphium (Rosinweed, Prairie Dock, etc.) - involucral bracts subequal or imbricate in 2—several series, firm, herbaceous or partly membranous-chartaceous.

Coreopsis (Tickseed) - involucral bracts biseriate (arranged in two rows or series) and dimorphic (with two forms), all joined at the base, the outer narrower, usually shorter, and commonly more herbaceous then the generally membranous and striate inner.

Rudbeckia (Coneflower, Black-eyed Susan) - involucral bracts subequal or irregularly unequal, green and more or less herbaceous, mostly spreading or reflexed, in 2-3 series.

Polynmia (*Smallanthus*) (Leafcup) - involucre a single series of green bracts, the bracts subtending the pistillate flowers larger and more herbaceous than those of the disk.

Helenium (Sneezeweed) - involucral bracts in 2-3 series, subequal or the inner shorter, more or less herbaceous, spreading or often soon deflexed, the outer sometimes joined at the base.

Solidago (Goldenrod) - involucral bracts more or less imbricate in several series, or rarely subequal, more or less chartaceous at the base, commonly with a more herbaceous green tip, in a few species longitudinally evidently striate-nerved.

This is a very simple key based on the pictures in the handout "Composite Bract Pictures." This key is not guaranteed to work on every species in the genera covered, but should be helpful in separating some of these DYC's in the field.

1. Involucre (and flowers) generally very small, many flowers on each peduncle; lower part of involucral bracts papery, not white, but with a green herbaceous tip, sometimes with longitudinal stripes.....*Solidago*
1. Involucre and flowers larger, bracts either all green or in two series (outer green and inner yellow); each bract usually all one color not part papery and part green 2
    2. Involucral bracts evidently in 2 series, the outer green (herbaceous) and the inner membranous, usually the same color as the rays (yellow).....*Coreopsis*
    2. Involucral bracts mostly imbricate but if in two series not dimorphic, generally all green (herbaceous); bracts imbricate, spreading or reflexed.....3
        3. Involucre in 1 series of 5 - 8 large green bracts, bracts usually unequal in size.....*Polymnia*
        3. Involucre in 2 or more series of bracts.....4
            4. Involucral bracts very narrow above the base into linear segments; rays with 3 teeth.....*Helenium*
            4. Involucral bracts if linear, much wider and more herbaceous; rays usually without teeth.....5
                5. Involucral bracts wider above the base, either linear or wider at middle or tip.....*Rudbeckia*
                5. Involucral bracts generally widest at the base.....6
                    6. Involucral bracts not much overlapping, few, large, green (very herbaceous) and mostly blunt tipped.....*Silphium*
                    6. Involucral bracts very overlapping, smaller, not as herbaceous, much narrower with acute to acuminate tips.....*Helianthus*