in vivo (degradation, trapping, relocalization, etc.; Fig. 2). Several cases in which such small, functionalized protein binders have been used in Drosophila will be discussed, and a look into the promising future of research with Drosophila will end the presentation.

Disclosure of interest The author declares that he has no competing interest.

References

Further reading

https://doi.org/10.1016/j.crvi.2019.09.003

3 Insects as interactants in artists’ minds: Symbols and anti-symbols

Yvan Rahbé1,∗, Edwige Keller-Rahbé2, Sibylle Orlandi2
1 INRA, France
2 Laboratoire MAP, UMR5240, Université Claude-Bernard Lyon-1, bâtiment Lwoff, campus scientifique de La Doua, 43, boulevard du 11-Novembre-1918, 69100 Villeurbanne, France
* Corresponding author.
E-mail address: yvan.rahbe@inra.fr (Y. Rahbé)

Insects, as small animals of frequent and easy access to humans, at least under their non-flying larval stages, have always been of interest to our species. The interest has probably been nutritional, but also naturalistic and symbolic. Many aspects of insects’ biology are of high symbolic potential, among which biodiversity, metamorphosis or flight. These three creative attributes of the insect orders, over the mammalian order at least—the self or reference class of human life—, probably induced early interests in human societies. This interest is indicated by folk classification of insects in some indigene cultures of northern America or central Africa [1]. Representation of insects in paleolithic art is scarce but existing; one of the earliest attested records could be that of “the buprestid” of Arcy-sur-Cure, revised as a ground beetle—carabid—(Magdalenian III, ∼15 000 years BP), or that of “the grasshopper” of Enlène [2]. The first is sculpted in lignite and could have served as a shamanic representation, while the latter is more obviously naturalistic in nature, and carved on bone. The more recently discovered Chauvet cave might contain insect representations (a “butterfly” or a many-legged animal), but no attested insects yet. Similarly, no insect mention come yet from Sulawesi caves (late Mousterian, < 30 000 years BP). Neolithic representations are much more numerous, as exemplified by bee hunting and bee rearing in Iberian or Egyptian pastoral and monumental arts. This trend culminated in Egyptian jewellery and its quasi-industrial representations of scarab or dung beetles. Noteworthy, most prehistoric representation of insects lie on coleoptera and Hymenoptera, and associated with symbolic features linked to colour, strength (beetles), metamorphosis (all) or social and utility behaviours (bees, ants). Aristotle himself did not clearly recognize aphids as a group, as the ancient Greek word ψυγγός did not differentiate aphids and psyllids. Many mentions however, on the reproduction of such insects, for example, show that he was talking of aphids.

In line with these historical roots, insects have been associated with far eastern or Christian society arts [3]—in contrast, Islamic and Jewish imaging or alimentary taboos having banned them from visible representations in middle eastern societies. A previous review on the subject gives an excellent outline of our matter, restricted to European painting [4]. I will here sketch a variant perspective, trying to uncover a hitherto hidden monument of cultural entomology, with the case study of the representation of aphids (Hemiptera: Aphididae) in various arts and all periods of history. Our purpose is to draw a reflexive perspective on what such invisible insects, through their invisibility, tell us of their representation in artists’ minds, and more generally in any human mind (being he a reader, a writer, a watcher, an actor, or in any position of the artistic universe).

The first and archetypal position to be quoted in my survey of invisible insects is the detail aphid. This position of a subject, the detail, have been analysed thoroughly in the history of arts [5]. It reflects both scientific and artistic mastery end precision (it is painted because it exists), and a position of power of the painter who is freely choosing low signification or even forbidden or non-codified subjects due to the act of freedom of the artist (and art factories, often specialized in such very specific matters). I paint it because I want/know it. This is characteristic of the Flemish and Dutch renaissance, as visible in the Bouquet of flowers in a vase by Jan velvet Brueghel the Elder (Fig. 1).

In contrast to many of its fellow insects, cricket, coleoptera, syrphid, the aphid is extremely difficult to localize (Fig. 1A), and needs an intensive focus on its lily host-plant to be seen (Fig. 1B). However, in spite of its minute size, it is precisely depicted, and the crescent-marked lily aphid was recognized by expert aphidologists (Colin Favret, pers. comm.). A non-expert comparison between object and subject (Fig. 1B,C,D), be it living (1 C) or mounted (1D) is edifying and informs us on the naturalistic and observational abilities of the painter(s).

As one may imagine, such identification of aphids in European classical painting is extremely difficult and has been only found on three occasions and with the help of the G-art Gigapixel project, apart from Fig. 1: in another still life by velvet Brueghel, Flowers in a Vase displaying at the Antwerp museum of fine arts, and in a third Chat renversant a vase de fleurs by Abraham Mignon, Museum of Fine Arts, Lyon.

Fig 1 Bouquet of flowers in a vase, by Jan Brueghel the Elder (1608, oil on copper 65 × 45 cm); original (A) in the Pinacoteca Ambrosiana (Milan, Italy). © with permission. Detail with an aphid on a lily leaf (B) situated at the bottom-left corner of the bouquet. Inferred species, with the help of Dr C. Favret: Neomyzus circumflexus, quoted from Encyclop aphid (C) with its typical darkish crescent on the back (D).
All Dutch painters.

One easy case of "naturalistic aphid" lie in the paintings of Maria Sibylla Merian, a painter and entomologist of the seventeenth century who studied aphids in numerous works, and both entitled some of her paintings with the word, and depicted the whole aphid ecosystem including all trophic levels in the global picture (Rode akelei met bladwesep en bladluis, 1684).

One important item in our quest is the topos of the female aphid (and eventually superfemale aphid). It probably did not start with Christ (Jesus). This invasion of the female-only character over the Holy Trinity was increasingly popular in central Europe from the fortieth to the sixtieth century ([https://fr.wikipedia.org/wiki/Sainte_Anne_trinitaire], and was recurrent and frequent topos of the unique to aphids, and the mystery of immaculate conception is what could be called the to explode, and I will only quote two examples. One

Coming to modern art, the appearance of aphids tends also present in post-nineteenth-century occurrences, typically following a real tribute to parthenogenesis in the masterpiece of Simone de Beauvoir, Le deuxième sexe (Volume 1, Chapter 1, “The data of Biology”). One may also quote in this very context the interesting parallel, made by the contemporary art blog Quadrivia, between parthenogenesis and the codified representation of “Sainte Anne triinaire” in the mosaic Carollian style of Boris Vian ([https://quadriv.wordpress.com/2011/06/10/jesus-aphids-and-parthenogenesis/]).

Le Génie des alpages, F'Murr, Casterman.

**Disclosure of interest** The authors declare that they have no conflict of interest.

**References**


