



## WHERE DOES IT HURT THE MOST TO BE STUNG BY A BEE?

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You won't *be*lieve the pain a researcher put himself through to determine where on the human body it hurts the most to be stung by a bee.

The idea was inspired by an unfortunate situation when a honeybee flew up Michael Smith's shorts and stung him. He says "I was really surprised that it didn't hurt as much as I thought it would." The experience got him thinking: Where is the most painful place on the body to get stung by a bee?<sup>26</sup>

With the financial support from a National Science Foundation (NSF) Graduate Research Fellowship grant to Cornell University, Smith conducted a series of stinging experiments on himself to find out. Cornell has received nearly \$32 million from NSF for the fellowship program since 2011.<sup>27</sup>

Over a series of months, Smith forced honey bees to sting more than 25 locations on his body from the face to the genitals. He then rated the pain caused by each of the stings on a scale of 1 to 10.<sup>28</sup> The greater the pain to a particular spot, the higher the number assigned.

Smith "self-administered" five stings a day.<sup>29</sup> To compel a bee to sting, it was "grabbed by the wings and pressed against the desired sting location. The bee was held against the sting location until the sting was first felt, and kept at the location for 5 seconds to ensure that the stinger would penetrate the skin. When the bee was pulled away, the stinger was left in the skin for 1 minute, then removed with forceps."<sup>30</sup>

"All the stings induced pain in the author. The pain rating for each location was averaged over the three rounds."<sup>31</sup> At least five minutes were to elapse between stings, "longer if pain from the previous sting persisted."<sup>32</sup>

The three least painful locations to be stung by a bee were the skull, middle toe tip, and upper arm.<sup>33</sup> The most painful places were the nostril, upper lip, and—not surprisingly—the genitals.<sup>34</sup>

Smith says bee stings down there are painful, "but if you're stung in the nose and penis, you're going to want more stings to the penis over the nose, if you're forced to choose."<sup>35</sup>

"Stings to the nostril were especially violent, immediately inducing sneezing, tears and a copious flow of mucus," according to Smith.<sup>36</sup> "By the time I got round to the third round, I thought: I really don't want to do my nose again," he says.<sup>37</sup>

“I had originally had the eye on the list, but when I talked to [my advisor Tom Seeley], he was concerned that I might go blind,” notes Smith, saying “I wanted to keep my eyes.”<sup>38</sup>

He concedes “this study is limited by its low sample size: one person, the author. It is possible that if other people were tested, they would not rank the painfulness of the stings in the same way, or perceive pain similarly by location. Although these findings cannot be generalized, they are still interesting.” He further notes “some locations only apply to male anatomy (i.e., scrotum and penis), and males are known to have differing pain thresholds compared to females.”<sup>39</sup>

To prepare for the study, “the author had received approximately 5 stings per day for three months before the experiment.”<sup>40</sup> In total, Smith estimates he was stung about 200 times during his honeybee study.<sup>41</sup>

As for the ethics of subjecting a human test subject to hundreds of bee stings, the study points out “Cornell University’s Human Research Protection Program does not have a policy regarding researcher self-experimentation, so this research was not subject to review from their offices. The methods do not conflict with the Helsinki Declaration,” which is a set of ethical principles for research involving human subjects developed by the World Medical Association. “The author was the only person stung, was aware of all associated risks therein, gave his consent.”<sup>42</sup>

It is this kind of spending that puts a bee in the bonnet of taxpayers.



## AVERAGE PAIN RATINGS

BODY LOCATION		PAIN RATING
MEDICAL TERMINOLOGY	LAYPERSON TERMINOLOGY	AVERAGE RATING
Anterior vertex	Skull	2.3
Third distal phalanges (foot)	Middle toe tip	2.3
Proximal humerus, dorsal aspect	Upper arm	2.3
Buttocks	Buttock	3.7
Dorsal aspect of leg	Calf	3.7
Posterior trunk, lumbar region	Lower back	4.0
Anterior aspect of proximal thigh	Upper thigh	4.7
Anatomic wrist, ventral aspect	Wrist	4.7
Foot, plantar surface	Foot arch	5.0
Distal arm, dorsal aspect	Forearm	5.0
Popliteal fossa	Back of the knee	5.0
Posterior neck, cervical region	Back of the neck	5.3
Postauricular	Behind the ear	5.3
Hand, dorsal aspect	Top of the hand	5.3
Foot, dorsal aspect	Top of the foot	6.0
Abdomen	Abdomen	6.7
Third distal phalanges	Middle finger tip	6.7
Nipple	Nipple	6.7
Axilla	Armpit	7.0
Buccal aspect of face	Cheek	7.0
Hand, anterior aspect	Palm	7.0
Scrotum	Scrotum	7.0
Body of penis, dorsal aspect	Penis shaft	7.3
Tubercle of superior lip	Upper lip	8.7
Anterior nares	Nostril	9.0